UNDERGROUND INJECTION CONTROL

AREA PERMIT REAPPLICATION

FOR

GROUND RESOURCES, LLC

UIC PERMIT No. 2R08700008AP

TARIFF FIELD

Volume 1 of 4

(Sections 1 to 16)

CHECKLIST FOR FILING A UIC PERMIT APPLICATION

Please utilize this checklist to ensure you have prepared, completed, and enclosed all required documentation and payment to ensure a timely review of your submittal.

Operator	Ground Resources, LLC		
Existing UIC Permit ID Number	2R08700008AP	UIC Well API Number	SEE ATTACHED

Office of Oil and Gas Office Use Only	
Permit Reviewer	A. Lockwood
Date Received	10/31/17
Administratively Complete Date	9/15/20
Approved Date	10/01/20
Permit Issued	

Please check the fees and payment included.

Fees		Payment Type	
UIC Permit Fee: $500	✔	Check -14734	✔
Groundwater Protection Plan (GPP) Fee: $50.00	✔	Electronic	
		Other	

Please check the items completed and enclosed.

- ✔ Checklist
- ✔ UIC-1
  - ✔ Section 1 – Facility Information
  - ✔ Section 2 – Operator Information
  - ✔ Section 3 – Application Information
  - ✔ Section 4 – Applicant/Activity Request and Type
  - ✔ Section 5 – Brief description of the Nature of the Business
  - ✔ CERTIFICATION
- ✔ Section 6 – Construction
  - ✔ Appendix A Injection Well Form
  - ✔ Appendix B Storage Tank Inventory
- ✔ Section 7 – Area of Review
  - ✔ Appendix C Wells Within the Area of Review

- [x] Appendix D Public Service District Affidavit
- [x] Appendix E Water Sources
- [x] Appendix F Area Permit Wells
- [x] Section 8 – Geological Data on Injection and Confining Zones
- [x] Section 9 – Operating Requirements / Data
  - [x] Appendix G Wells Serviced by Injection Well
- [x] Section 10 – Monitoring
- [x] Section 11 – Groundwater Protection Plan (GPP)
  - [x] Appendix H Groundwater Protection Plan (GPP)
- [x] Section 12 – Plugging and Abandonment
- [ ] Section 13 – Additional Bonding -NA
- [x] Section 14 – Financial Responsibility
  - [x] Appendix I Financial Responsibility
- [ ] Section 15 – Site Security Plan -NA
  - [ ] Appendix J Site Security for Commercial Wells -NA
- [x] Section 16 – Additional Information
  - [x] Appendix K Other Permit Approvals

NOTE: For all 2D wells an additional bond in the amount of $5,000 is required.

Reviewed by (Print Name): Blake E. Jones

Reviewed by (Sign): Blake E. Jones

Date Reviewed: 9.28.2020

UIC-1
(4/25)

WEST VIRGINIA DEPARTMENT OF
ENVIRONMENTAL PROTECTION
OFFICE OF OIL AND GAS
601 57th Street, SE
Charleston, WV 25304
(304) 926-0450
www.dep.wv.gov/oil-and-gas

UNDERGROUND INJECTION CONTROL
(UIC)
PERMIT APPLICATION

UIC PERMIT ID # 2R08700008AP API # See Attached WELL # TARIFF FIELD

Section I. Facility Information

Facility Name: TARIFF FIELD

Address: 1422 TARIFF ROAD

City: Left Hand State: WV Zip: 25251

County: Roane District: Smithfield & Geary

Location description:
From the city of Charleston, WV, travel North on I-77 for approx. 1.6 miles. Keep right to continue on I-79 North, follow signs for Clarksburg, and travel for approx. 25.1 miles. Take exit 25 toward Amma and travel approx. 0.4 miles. Turn right onto Co. Route 29/Amma Road and travel approx. 0.7 miles. Take the first left onto Amma Road/Co. Route 58/2 and continue to follow Amma Rd. for approx. 3.6 miles. Turn right onto WV-36 South and travel approx. 0.6 miles. Take a slight left onto Co. Route 60/Tariff Road and travel approx. 1.8 miles. Take a slight right and travel approx. 0.3 miles. The facility will be on the left.

Location of well(s) or approximate center of field/project in UTM NAD 83 (meters):
Northing: 4279357.4 Easting: 481520.87 Lat. 38.6626 Long. -81.2124

Environmental Contact Information:
Name: ~~Jon Hall~~ Adam Linkinogger Title: Supervisor
Phone: 304-587-4477 Email: ~~jon.hall~~adam.linkinogger@groundresourcesllc.com

Section 2. Operator Information

Operator Name: GROUND RESOURCES, LLC
Operator ID: 494520132

Address: 513 Charleston Road
City: Spencer State: WV Zip: 25276
County: Roane

Contact Name: Erica Nichols Contact Title: Office Manager
Contact Phone: 304-927-2996 Contact Email: erica@meter1.com

Section 3. Applicant Information

Ownership Status: ■ PRIVATE ☐ PUBLIC ☐ FEDERAL ☐ STATE
☐ OTHER (explain):

SIC code: ■ 1311 (2D, 2H, 2R) ☐ 1479 (3S) ☐ OTHER (explain):

Section 4. Applicant / Activity Request and Type:

A. Apply for a new UIC Permit: ☐ 2D ☐ 2H ☐ 2R ☐ 3S
B. Reissue existing UIC Permit: ☐ 2D ☐ 2H ■ 2R ☐ 3S
C. Modify existing UIC Permit: ☐ 2D ☐ 2H ☐ 2R ☐ 3S
(Submit only documentation pertaining to the modification request)
2D COMMERCIAL FACILITY: ☐ YES ■ NO

Section 5. Briefly describe the nature of business and the activities to be conducted:

Oil and/or Gas production. Subsurface injection of produced and/or fresh water into the Big Injun formation for the secondary recovery of oil.

CERTIFICATION

All permit applications must be signed by a responsible corporate officer for a corporation, by a general partner for a partnership, by the proprietor of a sole proprietorship, or by a principal executive or ranking elected official for a public agency, or a [1]duly authorized representative in accordance with 47CSR13-13.11.b.

A. Name and title of person applying for permit:

Print Name: David W Heeter

Print Title: Owner

B. Signature and Date.

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature: David W Heeter

Date: 9/25/2020

[1] A person is a duly authorized representative if:

The authorization is made in writing by a person described in subdivision 47CSR13-13.11.a.

The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of the plant manager, operator of a well or a well field, superintendent, or position of equivalent responsibility.

The written authorization is submitted to the Director.

Section 6
Construction

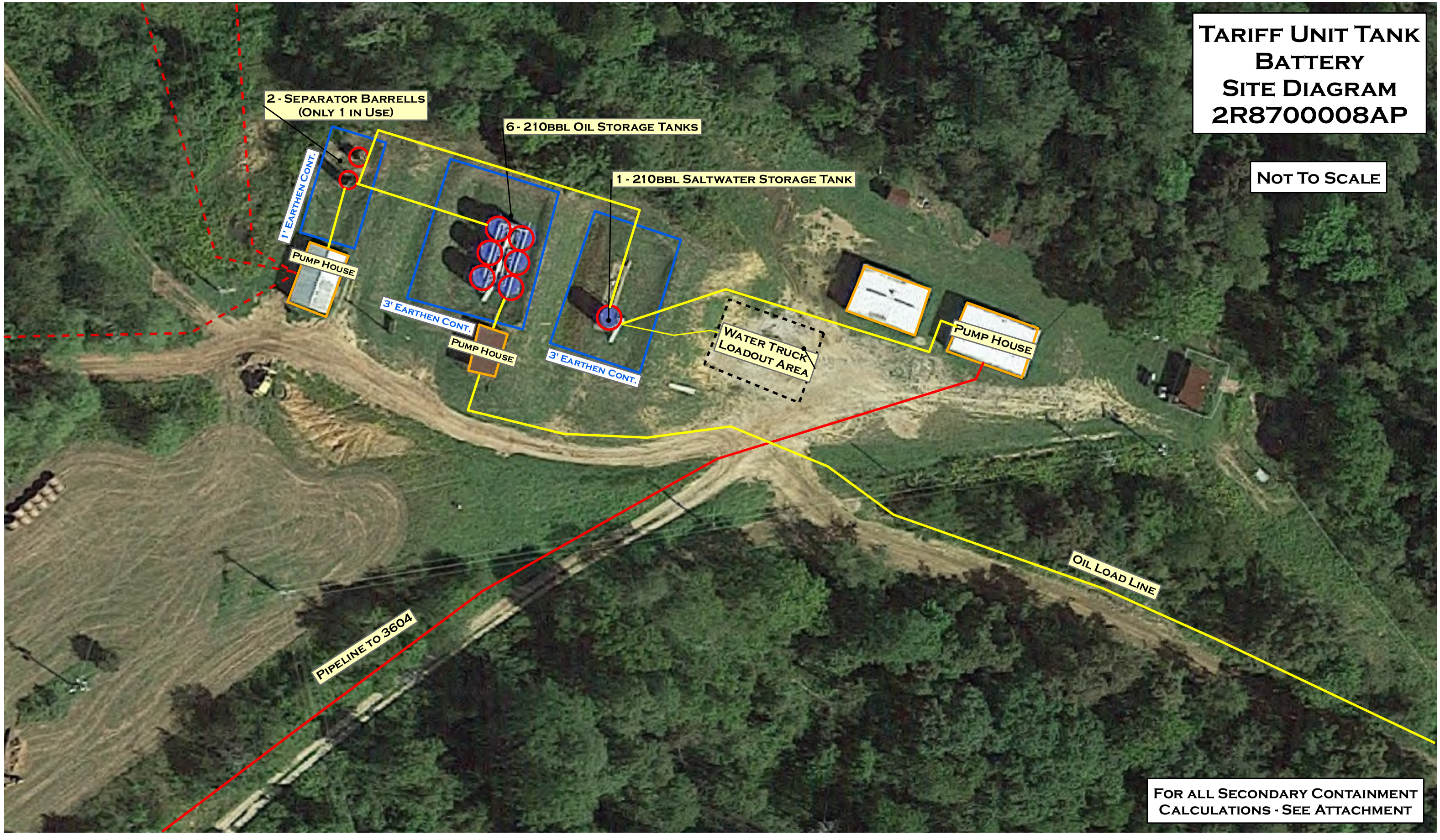
Ground Resources, LLC
Tariff Field
Permit No. 2R08700008AP

Appendix B – Storage Tank Inventory
Injection Facility Site Map
Secondary Containment Calculations

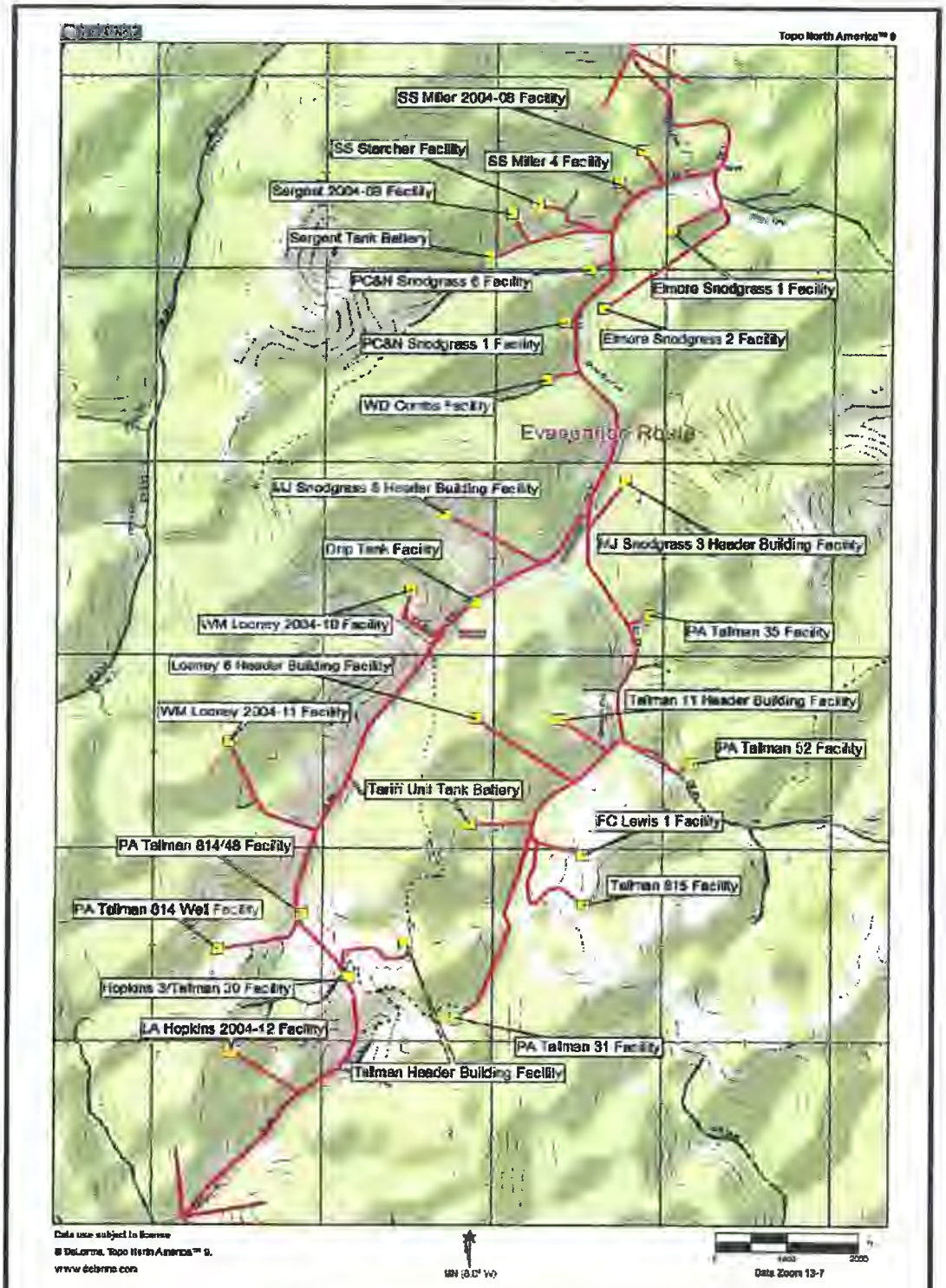

TARIFF UIC
PERMIT
2R8700008AP
TARIFF UNIT
TANK BATTERY
PUMP HOUSE
PIPELINE FROM PUMPHOUSE TO 3604
38.6492° N, 8132084°W
3604
PROPOSED PIPELINE FROM 3604 to 2080
38.6469°N, 81.2199°W
2080
TARIFF UNIT TANK BATTERY
PIPELINE OVERVIEW
NOT TO SCALE

Tariff Unit Tank Battery Site Diagram 2R8700008AP

Not To Scale



For all Secondary Containment Calculations - See Attachment



ES&H
The Total Assurance Team

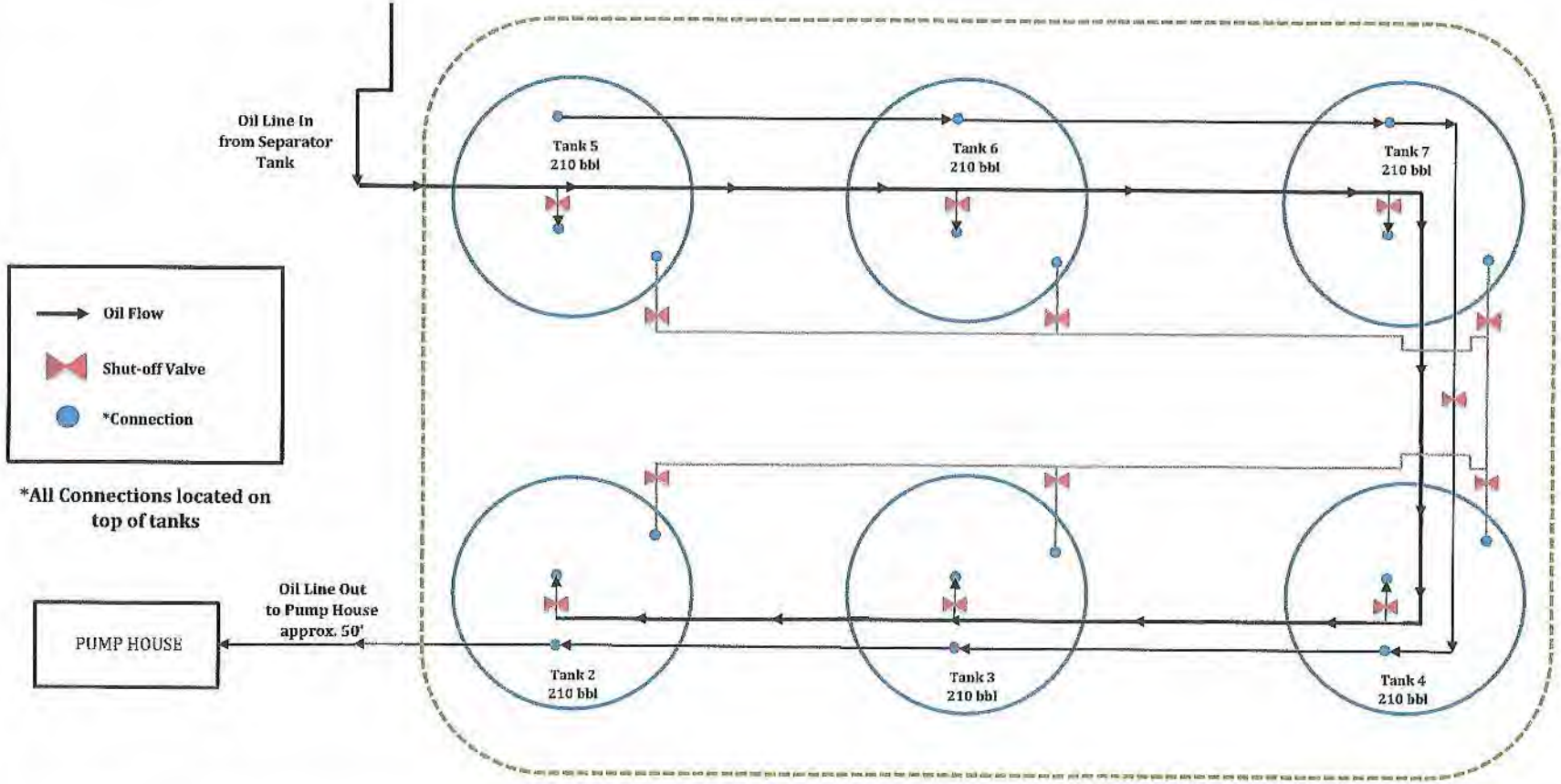
Triad Hunter, LLC
Tariff Field Facilities
Roane County, West Virginia
Topographic Evacuation Route Map

(4/2...

APPENDIX B
Storage Tank Inventory

API #	Tank ID	Tank Location (UTM NAD 83 Meters)		Installation Date	Tank Age (Months)	Construction Material (Steel, plastic, etc.)	Capacity (gallons)	Type of Fluid Stored	Volume of Fluid Stored (gallons)	Tank Type Single/Double Wall
		Northing	Easting							
	131036	4278085.00	481897.00	Approx. 1/1/1990		STEEL	210	Brine Water	<210	SINGLE
	131039	4278085.00	481897.00	Approx. 1/1/1990		STEEL	210	OIL	<210	SINGLE
	131038	4278085.00	481897.00	Approx. 1/1/1990		STEEL	210	NOT IN USE	0	SINGLE
	131037	4278085.00	481897.00	Approx. 1/1/1990		STEEL	210	OIL	<210	SINGLE
	131040	4278085.00	481897.00	Approx. 1/1/1990		STEEL	210	OIL	<210	SINGLE
	131041	4278085.00	481897.00	Approx. 1/1/1990		STEEL	210	OIL	<210	SINGLE
	131042	4278085.00	481897.00	Approx. 1/1/1990		STEEL	210	OIL	<210	SINGLE

Tariff Field UIC Permit 2R8700008AP	**Oil Storage Tanks Plumbing Schematic** (not to scale)	Ground Resources, LLC 7/6/2020



Created by: Blake E Jones

Ground Resources, LLC
Tariff Field
UIC 2R08700008AP

Secondary Containment Calculations

Oil Storage Area (6 - 210 bbl Tanks)
Earth Berm Containment
(Input Measurements In Blue Cells)

Tank	Tank Dimensions		Capacity		
	Height (Ft)	Dia (Ft)	Barrels	Gallons	Cu Ft
1	15.0125	10	210.0	8820.1	1179.1
2	15.0125	10	210.0	8820.1	1179.1
3	15.0125	10	210.0	8820.1	1179.1
4	15.0125	10	210.0	8820.1	1179.1
5	15.0125	10	210.0	8820.1	1179.1
6	15.0125	10	210.0	8820.1	1179.1
7			0.0	0.0	0.0
8			0.0	0.0	0.0
9			0.0	0.0	0.0
10			0.0	0.0	0.0
		Total	1,260.0	52,920.7	7,074.5
		Input Largest Tank as Tank No.1 Above			

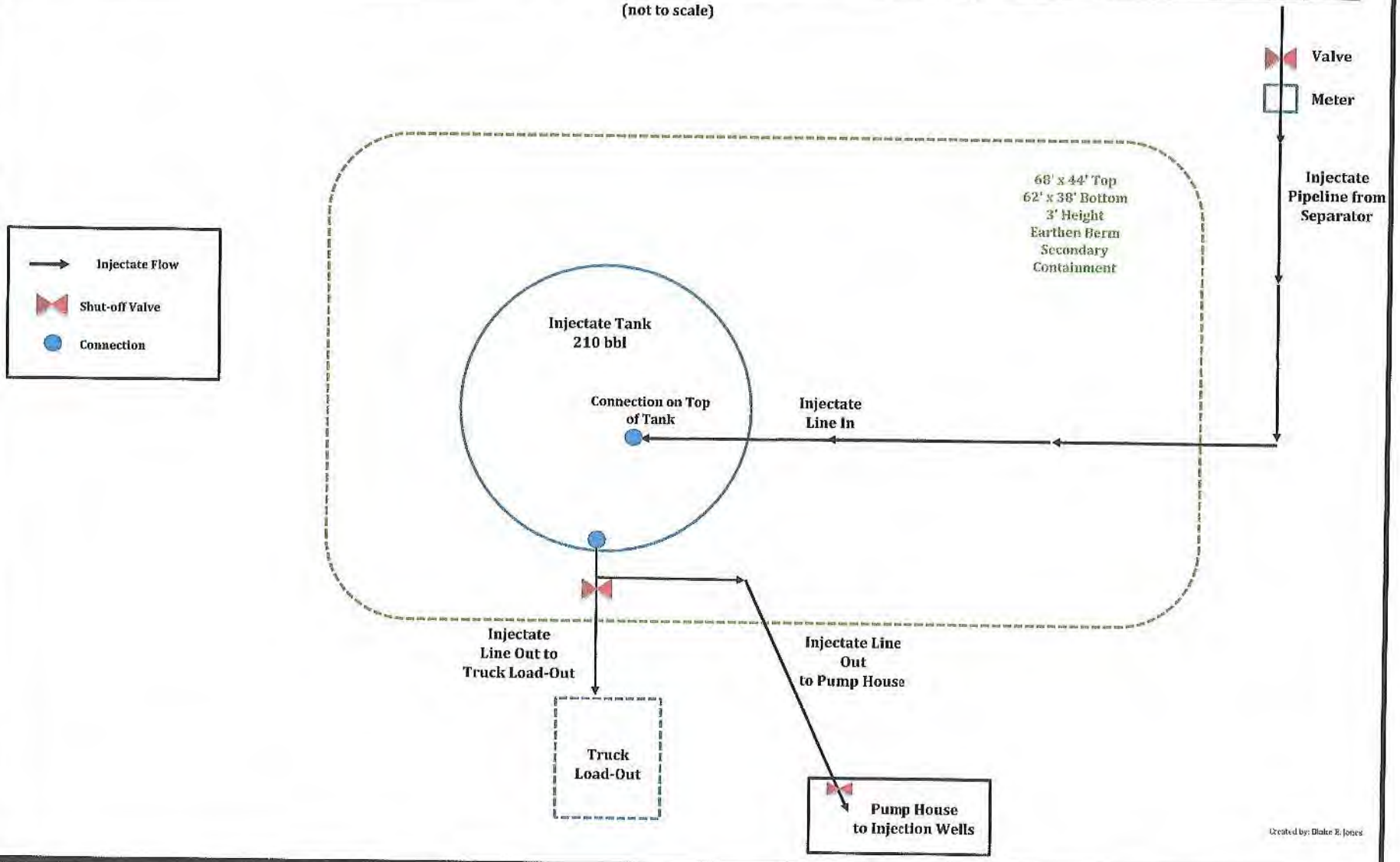
Tank	Tank Base Exclusions		
	Dia (Ft)	Depth (Ft)	Vol (CuFt)
1	0	3.00	0.0
2	10	3.00	235.6
3	10	3.00	235.6
4	10	3.00	235.6
5	10	3.00	235.6
6	10	3.00	235.6
7	0	3.00	0.0
8	0	3.00	0.0
9	0	3.00	0.0
10	0	3.00	0.0
Total Tank Base Exclusions			1178.1
Enter "0" diameter for the largest volume tank to exclude it from the tank base exclusion calculations.			

Containment Dimensions	
Top Interior Perimeter	
Length (Ft)	Width (Ft)
68.00	38.00
Bottom Interior Perimeter	
Length (Ft)	Width (Ft)
62.00	32.00
Depth (Ft)	
3.00	
Total Containment Volume (CuFt)	6832.2
All containment measurements must be interior dimensions.	

Tank Containment Volume (CuFt)	6832.2
Minus Tank Base Exclusions (CuFt)	1178.1
Net Containment Volume (CuFt)	5654.1
Largest Tank Volume (CuFt)	1179.1
Available Containment Volume (CuFt)	479.5%

Tariff Field UIC Permit 2R8700008AP	Injectate (Produced Brine) Tank Plumbing Schematic	Ground Resources, LLC 7/6/2020

(not to scale)



Ground Resources, LLC
Tariff Field
UIC 2R08700008AP

Secondary Containment Calculations

Brine Storage Area (1 - 210 bbl Tank)
Earth Berm Containment
(Input Measurements In Blue Cells)

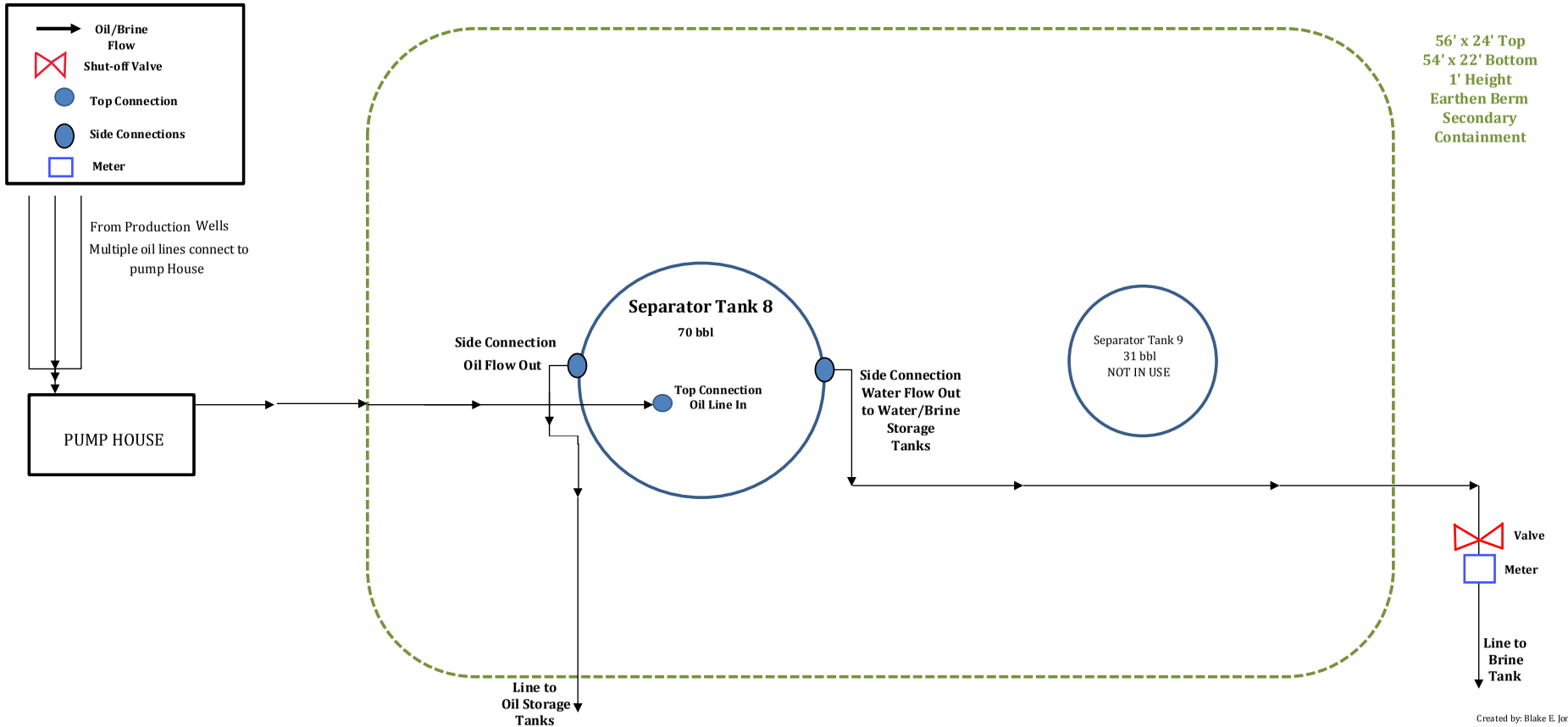
Tank	Tank Dimensions		Capacity		
	Height (Ft)	Dia (Ft)	Barrels	Gallons	Cu Ft
1	15.0125	10	210.0	8820.1	1179.1
2			0.0	0.0	0.0
3			0.0	0.0	0.0
4			0.0	0.0	0.0
5			0.0	0.0	0.0
6			0.0	0.0	0.0
7			0.0	0.0	0.0
8			0.0	0.0	0.0
9			0.0	0.0	0.0
10			0.0	0.0	0.0
		Total	210.0	8,820.1	1,179.1
		Input Largest Tank as Tank No.1 Above			

Tank	Tank Base Exclusions		
	Dia (Ft)	Depth (Ft)	Vol (CuFt)
1	0	3.00	0.0
2	0	3.00	0.0
3	0	3.00	0.0
4	0	3.00	0.0
5	0	3.00	0.0
6	0	3.00	0.0
7	0	3.00	0.0
8	0	3.00	0.0
9	0	3.00	0.0
10	0	3.00	0.0
Total Tank Base Exclusions			0.0
Enter "0" diameter for the largest volume tank to exclude it from the tank base exclusion calculations.			

Containment Dimensions	
Top Interior Perimeter	
Length (Ft)	Width (Ft)
68.00	44.00
Bottom Interior Perimeter	
Length (Ft)	Width (Ft)
62.00	38.00
Depth (Ft)	
3.00	
Total Containment Volume (CuFt)	8003.0
All containment measurements must be interior dimensions.	

Tank Containment Volume (CuFt)	8003.0
Minus Tank Base Exclusions (CuFt)	0.0
Net Containment Volume (CuFt)	8003.0
Largest Tank Volume (CuFt)	1179.1
Available Containment Volume (CuFt)	678.8%

Tariff Field UIC Permit 2R8700008AP	**Separator Tanks Plumbing Schematic** **(not to scale)**	Ground Resources, LLC 7/6/2020



Ground Resources, LLC
Tariff Field
UIC 2R08700008AP

Secondary Containment Calculations

Oil Separator Storage Area (1 - 70 bbl Tank, 1 - 30 bbl Tank)
Earth Berm Containment
(Input Measurements in Blue Cells)

Tank	Tank Dimensions		Capacity		
	Height (Ft)	Dia (Ft)	Barrels	Gallons	Cu Ft
1	20	5	69.94	2937.6	392.7
2	13.5	4	30.2	1269.0	169.6
3			0.0	0.0	0.0
4			0.0	0.0	0.0
5			0.0	0.0	0.0
6			0.0	0.0	0.0
7			0.0	0.0	0.0
8			0.0	0.0	0.0
9			0.0	0.0	0.0
10			0.0	0.0	0.0
		Total	100.2	4,206.6	562.3

Input Largest Tank as Tank No.1 Above

Tank	Tank Base Exclusions		
	Dia (Ft)	Depth (Ft)	Vol (CuFt)
1	0	1.00	0.0
2	4	1.00	12.6
3	0	1.00	0.0
4	0	1.00	0.0
5	0	1.00	0.0
6	0	1.00	0.0
7	0	1.00	0.0
8	0	1.00	0.0
9	0	1.00	0.0
10	0	1.00	0.0
Total Tank Base Exclusions			12.6

Enter "0" diameter for the largest volume tank to exclude it from the tank base exclusion calculations.

Containment Dimensions	
Top Interior Perimeter	
Length (Ft)	Width (Ft)
56.00	24.00
Bottom Interior Perimeter	
Length (Ft)	Width (Ft)
54.00	22.00
Depth (Ft)	
1.00	
Total Containment Volume (CuFt)	1265.2

All containment measurements must be interior dimensions.

Tank Containment Volume (CuFt)	1265.2
Minus Tank Base Exclusions (CuFt)	12.6
Net Containment Volume (CuFt)	1252.6
Largest Tank Volume (CuFt)	392.7
Available Containment Volume (CuFt)	319.0%

Section 7
Area of Review

Injector Well Construction Data

All injector well construction data including Appendix A, Wellbore Diagrams, Completion Logs, and E-logs are contained in a separate volume of this application.

AOR Well Data

All AOR well data is contained in a separate volume of this application.

Appendix C
All Wells in 1/4 Mile AOR

Ground Resources, LLC
2R08700008AP
Tariff Field

	API No.	Well Name	Well Type	Well Status	Easting	Northing
1	4708700444	Looney 27	2R Oil Production	Active Well	481379.9	4278542.9
2	4708700701	Looney 28	Fluid Injection	Shut-In	481656.0	4278648.0
3	4708700702	Looney 29	2R Oil Production	Active Well	481534.0	4278367.0
4	4708702079	Tallman 53	2R Oil Production	Abandoned Well	482841.0	4278791.0
5	4708702080	Tallman 54	Fluid Injection	Shut-In	481550.6	4277629.1
6	4708702405	Tallman 55	Fluid Injection	Shut-In	481849.0	4277612.0
7	4708702406	Tallman 56	Fluid Injection	Shut-In	481763.0	4277369.6
8	4708702407	Tallman 57	Fluid Injection	Shut-In	481558.3	4277327.8
9	4708702408	Tallman 58	Fluid Injection	Shut-In	481369.9	4277506.4
10	4708702409	Tallman 59	Fluid Injection	Shut-In	481337.3	4277597.0
11	4708702554	Hopkins 2	Fluid Injection	Plugged	481402.1	4277209.0
12	4708702633	Looney 1	2R Oil Production	Abandoned Well	481752.0	4279082.0
13	4708702634	Looney 3	2R Oil Production	Active Well	481370.2	4277860.8
14	4708702635	Looney 4	2R Oil Production	Plugged	481082.6	4278821.5
15	4708702636	Looney 5	2R Oil Production	Plugged	481678.0	4278187.0
16	4708702637	Looney 6	2R Oil Production	Abandoned Well	481822.6	427856.2
17	4708702638	Looney 7	Fluid Injection	Shut-In	481742.0	4278369.0
18	4708702639	Looney 8	2R Oil Production	Abandoned Well	481418.9	4278063.9
19	4708702641	Looney 10	2R Oil Production	Abandoned Well	481565.2	4278643.3
20	4708702643	Looney 12	2R Oil Production	Abandoned Well	481469.4	4279013.9
21	4708702644	Looney 15	2R Oil Production	Active Well	481325.1	4279271.9
22	4708702773	MJ Snodgrass 4	2R Oil Production	Abandoned Well	482455.5	4279494.9
23	4708702775	MJ Snodgrass 6	2R Oil Production	Abandoned Well	481642.0	4279591.0
24	4708702778	MJ Snodgrass 12	Fluid Injection	Shut-In	482826.1	4279392.6
25	4708702818	Tallman 1	2R Oil Production	Abandoned Well	482035.7	4278948.2
26	4708702820	Tallman 3	2R Oil Production	Active Well	481270.0	4277697.0
27	4708702821	Tallman 4	2R Oil Production	Abandoned Well	481922.7	4278787.4
28	4708702822	Tallman 5	2R Oil Production	Plugged	482077.6	4278187.0
29	4708702823	Tallman 6	2R Oil Production	Abandoned Well	481763.0	4277995.0
30	4708702824	Tallman 7	2R Oil Production	Abandoned Well	481978.0	4278573.0
31	4708702825	Tallman 8	2R Oil Production	Abandoned Well	481498.7	4277741.6
32	4708702826	Tallman 9	2R Oil Production	Abandoned Well	481970.0	4278368.6
33	4708702827	Tallman 10	2R Oil Production	Abandoned Well	482196.3	4278754.6
34	4708702828	Tallman 13	2R Oil Production	Abandoned Well	481921.3	4278175.5
35	4708702831	Tallman 19	2R Oil Production	Abandoned Well	481643.1	4277531.9
36	4708702832	Tallman 20	2R Oil Production	Active Well	481369.3	4277516.4
37	4708702833	Tallman 21	2R Oil Production	Active Well	481176.1	4277516.9
38	4708702835	Tallman 23	2R Oil Production	Abandoned Well	481969.1	4277966.0
39	4708702836	Tallman 25	2R Oil Production	Plugged	481835.0	4277485.1

40	4708702837	Tallman 26	2R Oil Production	Active Well	481320.6	4277323.3
41	4708702838	Tallman 31	Oil Production	Active Well	481787.1	4277128.9
42	4708702839	Tallman 32	Oil Production	Plugged	481851.8	4277241.5
43	4708702840	Tallman 33	Gas Production	Abandoned Well	480933.8	4277179.2
44	4708702844	Tallman 40	Fluid Injection	Shut-In	482567.9	4279365.8
45	4708702941	Tallman 60	Fluid Injection	Plugged	481640.1	4277855.2
46	4708703071	Looney 24	2R Oil Production	Active Well	481053.3	4278804.6
47	4708703083	Looney 14	2R Oil Production	Active Well	481179.0	4278512.0
48	4708703088	Looney 17	2R Oil Production	Plugged	481630.0	4279318.0
49	4708703095	Looney 16	2R Oil Production	Active Well	481061.3	4278267.1
50	4708703096	Looney 18	Fluid Injection	Shut-In	481486.8	4279529.4
51	4708703097	Looney 25	2R Oil Production	Active Well	481154.8	4279200.0
52	4708703127	Looney 23	2R Oil Production	Active Well	481231.0	4278994.9
53	4708703130	Tallman 17	2R Oil Production	Abandoned Well	482299.5	4279032.4
54	4708703134	Hopkins 3	2R Oil Production	Active Well	481134.7	4277126.4
55	4708703135	Tallman 12	2R Oil Production	Abandoned Well	481585.0	4277983.0
56	4708703136	MJ Snodgrass 3	2R Oil Production	Abandoned Well	482322.0	4279416.0
57	4708703138	Tallman 27	2R Oil Production	Plugged	481563.8	4277320.8
58	4708703167	Tallman 37	2R Oil Production	Abandoned Well	482245.9	4279102.0
59	4708703175	Tallman 24	2R Oil Production	Active Well	481977.0	4277721.0
60	4708703179	Looney 2	2R Oil Production	Plugged	481147.0	4277999.0
61	4708703181	Tallman 11	2R Oil Production	Active Well	482208.0	4278485.1
62	4708703604	Tallman 61	Fluid Injection	Shut-In	481870.8	4277883.6
63	4708703605	Tallman 62	Fluid Injection	Shut-In	481870.8	4277883.6
64	4708703608	Tallman 65	Fluid Injection	Shut-In	481227.5	4277766.9
65	4708703609	Tallman 66	Fluid Injection	Plugged	481344.0	4277830.0
66	4708703624	Tallman 30	2R Oil Production	Active Well	481128.0	4277379.0
67	4708703659	Looney 30	Fluid Injection	Plugged	481627.0	4278350.0
68	4708703660	Looney 31	Fluid Injection	Shut-In	481758.5	4278368.1
69	4708703661	Looney 32	Fluid Injection	Plugged	481471.0	4277996.0
70	4708703662	Looney 35	Fluid Injection	Plugged	481290.3	4278198.1
71	4708703663	Tallman 67	Fluid Injection	Plugged	481627.0	4278071.0
72	4708703664	Tallman 68	Fluid Injection	Plugged	481841.0	4278113.0
73	4708703674	Looney 33	Fluid Injection	Plugged	481329.2	4278001.7
74	4708703675	Looney 34	Fluid Injection	Plugged	481274.5	4278178.1
75	4708703766	Tallman 69	Fluid Injection	Plugged	482029.0	4278300.0
76	4708703767	Looney 36	Fluid Injection	Plugged	481677.5	4278466.8
77	4708703768	Looney 37	Fluid Injection	Plugged	481855.2	4278707.8
78	4708703769	Looney 38	Fluid Injection	Plugged	481908.2	4278884.7
79	4708703771	MJ Snodgrass 100	Fluid Injection	Plugged	481731.8	4279255.3
80	4708703772	MJ Snodgrass 101	Fluid Injection	Plugged	481876.3	4279061.9
81	4708703773	MJ Snodgrass 102	Fluid Injection	Plugged	482069.5	4279125.8
82	4708703774	Looney 40	Fluid Injection	Shut-In	481566.4	4279126.9
83	4708703775	Tallman 70	Fluid Injection	Shut-In	481889.7	4278449.3
84	4708703776	Tallman 71	Fluid Injection	Shut-In	481890.1	4278626.5
85	4708703777	Tallman 72	2R Oil Production	Plugged	482035.4	4278819.4
86	4708703778	Tallman 73	Fluid Injection	Shut-In	482180.5	4278899.6

87	4708703781	Looney 39	Fluid Injection	Shut-In	481621.0	4278864.0
88	4708703875	Looney 42	Fluid Injection	Shut-In	481435.8	4278385.9
89	4708703876	MJ Snodgrass 105	Fluid Injection	Plugged	481679.6	4279416.3
90	4708703877	Tallman 74	Fluid Injection	Plugged	482018.0	4278089.0
91	4708703878	Tallman 76	Fluid Injection	Shut-In	482147.6	4278561.5
92	4708703879	Tallman 75	Fluid Injection	Shut-In	482066.8	4278465.0
93	4708703880	Looney 41	Fluid Injection	Shut-In	481502.4	4279335.9
94	4708703968	Looney 47	2R Oil Production	Active Well	481549.3	4278723.9
95	4708703974	Looney 44	Fluid Injection	Plugged	481435.0	4278625.0
96	4708703976	Looney 46	Fluid Injection	Plugged	481298.0	4279125.0
97	4708703977	Looney 45	Fluid Injection	Plugged	481404.7	4278853.0
98	4708704013	Tallman 64	Fluid Injection	Shut-In	481160.3	4277629.7
99	4708704078	Looney 43	Fluid Injection	Shut-In	481298.0	4279125.0
100	4708704079	Looney 48	Fluid Injection	Plugged	481210.9	4278611.8
101	4708704080	Looney 49	Fluid Injection	Plugged	481243.6	4278821.1
102	4708704168	Looney 51	2R Oil Production	Active Well	481020.0	4278967.0
103	4708704172	Looney 50	Fluid Injection	Shut-In	481191.0	4279045.0
104	4708704421	200410	Gas Production	Active Well	481518.2	4279207.0
105	4708704623	MJ Snodgrass 813	Gas Production	Abandoned Well	482992.6	4279635.6
106	4708790804	Pre-1929 Unknown	Oil Production	Plugged	480952.5	4277018.2
107	4708790805	Pre-1929 Unknown	Oil Production	Plugged	480985.2	4277227.4
108	4708790806	Pre-1929 Unknown	Oil Production	Plugged	481194.4	4277178.6
109	4708790808	Pre-1929 Unknown	Oil Production	Plugged	481741.8	4277129
110	4708790809	Pre-1929 Unknown	Oil Production	Plugged	481999.7	4277241.2
111	4708790810	Pre-1929 Unknown	Oil Production	Plugged	481436.2	4277274.7
112	4708790811	Pre-1929 Unknown	Oil Production	Plugged	481645.6	4277338.6
113	4708790812	Pre-1929 Unknown	Oil Production	Plugged	481935.7	4277434.6
114	4708790818	Pre-1929 Unknown	Oil Production	Plugged	481162.6	4277372
115	4708790819	Pre-1929 Unknown	Oil Production	Plugged	481420.4	4277403.6
116	4708790820	Pre-1929 Unknown	Oil Production	Plugged	481372.5	4277580.8
117	4708790821	Pre-1929 Unknown	Oil Production	Plugged	481082.5	4277549.3
118	4708790822	Pre-1929 Unknown	Oil Production	Plugged	481630.1	4277596.3
119	4708790832	Pre-1929 Unknown	Oil Production	Plugged	481050.9	4277807.1
120	4708790833	Pre-1929 Unknown	Oil Production	Plugged	481083.6	4278016.4
121	4708790834	Pre-1929 Unknown	Oil Production	Plugged	481197	4278273.8
122	4708790835	Pre-1929 Unknown	Oil Production	Plugged	481485.6	4277757.7
123	4708790836	Pre-1929 Unknown	Oil Production	Plugged	481341	4277903
124	4708790837	Pre-1929 Unknown	Oil Production	Plugged	481389.8	4278128.4
125	4708790838	Pre-1929 Unknown	Oil Production	Plugged	481615.5	4278240.6
126	4708790843	Pre-1929 Unknown	Oil Production	Plugged	481937.6	4278288.2
127	4708790844	Pre-1929 Unknown	Oil Production	Plugged	482066.2	4278191.2
128	4708790848	Pre-1929 Unknown	Oil Production	Plugged	482453.4	4278544.7
129	4708790850	Pre-1929 Unknown	Oil Production	Plugged	482211.5	4278368.1
130	4708790851	Pre-1929 Unknown	Oil Production	Plugged	482002.6	4278513.5
131	4708790852	Pre-1929 Unknown	Oil Production	Plugged	482115.8	4278738.7
132	4708790853	Pre-1929 Unknown	Oil Production	Plugged	481680.4	4278433.7
133	4708790854	Pre-1929 Unknown	Oil Production	Plugged	481729.1	4278610.7

134	4708790855	Pre-1929 Unknown	Oil Production	Plugged	481858.2	4278755.4
135	4708790856	Pre-1929 Unknown	Oil Production	Plugged	481374.7	4278531
136	4708790857	Pre-1929 Unknown	Oil Production	Plugged	481632.9	4278820.3
137	4708790862	Pre-1929 Unknown	Oil Production	Plugged	480989.1	4278886.1
138	4708790863	Pre-1929 Unknown	Oil Production	Plugged	481246.5	4278805
139	4708790866	Pre-1929 Unknown	Oil Production	Plugged	482986.3	4279268.3
140	4708790868	Pre-1929 Unknown	Oil Production	Plugged	482825.1	4279155.9
141	4708790869	Pre-1929 Unknown	Oil Production	Plugged	482809.4	4279365.3
142	4708790874	Pre-1929 Unknown	Oil Production	Plugged	482584.2	4279430.2
143	4708790875	Pre-1929 Unknown	Oil Production	Plugged	482374.7	4279334
144	4708790876	Pre-1929 Unknown	Oil Production	Plugged	482438.7	4279156.7
145	4708790877	Pre-1929 Unknown	Oil Production	Plugged	482083.9	4278899.8
146	4708790878	Pre-1929 Unknown	Oil Production	Plugged	482245.2	4279044.4
147	4708790879	Pre-1929 Unknown	Oil Production	Plugged	482149	4279189.6
148	4708790880	Pre-1929 Unknown	Oil Production	Plugged	481923.3	4279077.3
149	4708790881	Pre-1929 Unknown	Oil Production	Plugged	481182.6	4279030.6
150	4708790882	Pre-1929 Unknown	Oil Production	Plugged	481456.3	4279013.9
151	4708790883	Pre-1929 Unknown	Oil Production	Plugged	481746.1	4279029.3
152	4708790887	Pre-1929 Unknown	Oil Production	Plugged	481633.9	4279255.1
153	4708790891	Pre-1929 Unknown	Oil Production	Plugged	481489.6	4279480.9
154	4708790892	Pre-1929 Unknown	Oil Production	Plugged	481747.2	4279496.4
155	4708790893	Pre-1929 Unknown	Oil Production	Plugged	481361.2	4279642.2
156	4708790894	Pre-1929 Unknown	Oil Production	Plugged	481634.8	4279641.6
157	4708790897	Pre-1929 Unknown	Oil Production	Plugged	481361.4	4279754.9
158	4708790898	Pre-1929 Unknown	Oil Production	Plugged	481506.4	4279770.7

Appendix F
Area Permit Wells - Injectors

Ground Resources, LLC
2R08700008AP
Tariff Field

	API No.	Well Name	Well Type	Well Status	Easting	Northing
1	4708700701	Looney 28	Fluid Injection	Shut-In	481656.0	4278648.0
2	4708702080	Tallman 54	Fluid Injection	Shut-In	481550.6	4277629.1
3	4708702405	Tallman 55	Fluid Injection	Shut-In	481849.0	4277612.0
4	4708702406	Tallman 56	Fluid Injection	Shut-In	481763.0	4277369.6
5	4708702407	Tallman 57	Fluid Injection	Shut-In	481558.3	4277327.8
6	4708702408	Tallman 58	Fluid Injection	Shut-In	481369.9	4277506.4
7	4708702409	Tallman 59	Fluid Injection	Shut-In	481337.3	4277597.0
8	4708702638	Looney 7	Fluid Injection	Shut-In	481742.0	4278369.0
9	4708702778	MJ Snodgrass 12	Fluid Injection	Shut-In	482826.1	4279392.6
10	4708702844	Tallman 40	Fluid Injection	Shut-In	482567.9	4279365.8
11	4708703096	Looney 18	Fluid Injection	Shut-In	481486.8	4279529.4
12	4708703604	Tallman 61	Fluid Injection	Shut-In	481870.8	4277883.6
13	4708703605	Tallman 62	Fluid Injection	Shut-In	481870.8	4277883.6
14	4708703608	Tallman 65	Fluid Injection	Shut-In	481227.5	4277766.9
15	4708703660	Looney 31	Fluid Injection	Shut-In	481758.5	4278368.1
16	4708703774	Looney 40	Fluid Injection	Shut-In	481566.4	4279126.9
17	4708703775	Tallman 70	Fluid Injection	Shut-In	481889.7	4278449.3
18	4708703776	Tallman 71	Fluid Injection	Shut-In	481890.1	4278626.5
19	4708703778	Tallman 73	Fluid Injection	Shut-In	482180.5	4278899.6
20	4708703781	Looney 39	Fluid Injection	Shut-In	481621.0	4278864.0
21	4708703875	Looney 42	Fluid Injection	Shut-In	481435.8	4278385.9
22	4708703878	Tallman 76	Fluid Injection	Shut-In	482147.6	4278561.5
23	4708703879	Tallman 75	Fluid Injection	Shut-In	482066.8	4278465.0
24	4708703880	Looney 41	Fluid Injection	Shut-In	481502.4	4279335.9
25	4708704013	Tallman 64	Fluid Injection	Shut-In	481160.3	4277629.7
26	4708704078	Looney 43	Fluid Injection	Shut-In	481298.0	4279125.0
27	4708704172	Looney 50	Fluid Injection	Shut-In	481191.0	4279045.0

APPENDIX D

Public Service District Affidavit

Underground Injection Control Permit applicants must identify all publically recorded drinking water sources within a one (1) mile radius of the proposed injection well facility. If no drinking water sources are present within this radius a written affidavit shall be supplied by the local Public Service District (PSD) as ample verification.

"I certify under penalty of law that (state name of business)

Ground Resources LLC.

has verified with the public service district (state name of PSD)

Clover PSD

that there are no such publically recorded sources.

Allison Sparks

(Signature of Authorized Representative)

Sworn and subscribed to before me this 1 day of May, 2018.

Christina Trent, my commission expires May 1, 2018

(Notary Signature)

Christina Trent

OFFICIAL SEAL
NOTARY PUBLIC
STATE OF WEST VIRGINIA
CHRISTINA TRENT
649 WV RT 18 S
West Union, West Virginia 26456
My Commission Expires May 1, 2018

(4/25)

APPENDIX E
Water Sources

Operator: GROUND RESOURCES, LLC Year 2017 UIC Permit # 2R08702AP

		Source # 1	Source # 2	Source # 3	Source # 4
Water Source Name		L. SNODGRASS	H. BOGGS	D. DEWEESE	D. KEEN
Northing		422132.6	4279193.5	4280939.5	4278534.3
Easting		481115.5	481890.3	482132.6	482392.6
Parameter	Units				
TPH - GRO	mg/L				
TPH - DRO	mg/L				
TPH - ORO	mg/L				
BTEX	mg/L				
Chloride	mg/L	15.0	61.0	53.0	31.0
Sodium	mg/L				
Total Dissolved Solids (TDS)	mg/L	249 J	3.34 J	267 J	210 J
Aluminum	mg/L				
Arsenic	mg/L				
Barium	mg/L				
Iron	mg/L	.72	.58	.34	2.14
Manganese	mg/L				
pH	SU	8.1	8.2	8.2	7.8
Calcium	mg/L				
Sulfate	mg/L				
MBAS	mg/L	.11	.01	.01	NOT DETECTED
Dissolved Methane	mg/L				
Dissolved Ethane	mg/L				
Dissolved Butane	mg/L				
Dissolved Propane	mg/L				
Bacteria (Total Coliform)	c/100mL				

TARIFF UIC PERMIT

SUBMITTED BY:
GROUND RESOURCES, LLC
DATE: 5/11/2018
Updated: 7/20/2020

USDW LOCATIONS

Legend

- USDW LOCATIONS
- TARIFF FIELD BOUNDARY
- .25 MILE AOR
- 1 MILE AOR

D. DEWEESE

H. BOGGS

D. KEEN

L. SNODGRASS

1 inch = 2,000 feet

0 1,000 2,000 4,000 Feet

N

W E

S

PREPARED BY:
BLAKE JONES, GIS SPECIALIST
PRECISION OIL AND GAS, INC.

Sturm Environmental Services

JOHN W STURM, PRESIDENT

COMPANY: PRECISION OIL & GAS, INC.

SAMPLE ID: TARIFF USDW L. SNODGRASS

SAMPLED BY: B. JONES

DATE/TIME SAMPLED:* 11-29-17 1315

DATE/TIME RECEIVED: 11-30-17 1222

LABORATORY ID: POG 171130-1

PARAMETER	TEST RESULTS	UNITS	METHOD	METHOD DETECTION LIMIT	DATE/TIME ANALYZED	ANALYST
*FIELD pH	7.6	units			11-29-17 1315	BJ
*FIELD TEMP	54	°F			11-29-17 1315	BJ
pH O	8.1	units	SM 22nd 4500 H B	.1	12-01-17 1540	KH
Fe	.72	mg/L	EPA 200.7 Rev 4.4-1994	.02	12-05-17 0745	DB
TDS	249 J	mg/L	SM22nd 2540 C	4	12-04-17 1459	MRS
Cl^-	15.0	mg/L	EPA 300.0 Rev 2.1-1993	.50	12-04-17 2222	DC
MBAS	.11	mg/L	SM22nd 5540C	.01	11-30-17 2350	SW

*Client Provided

**See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

Data Qualifiers

B Analyte found in reagent blank. Indicates possible reagent or background contamination.
E Estimated Reported value exceeded calibration range.
J Reported value is an estimate because concentration is less than reporting limit.
PND Precision not determined.
R Sample results rejected because of gross deficiencies in QC or method performance. Re-sampling and/or re-analysis is necessary.
RND Recovery not determined.
U Compound was analyzed for, but not detected.
O Out of holding. Time does not meet 40 CFR 136/141 compliance.
T This result is not supported by our certification ID.
A Does not meet 40 CFR 136/141 compliance.
C Does not meet 47 CSR 32 compliance.

Narrative:

Approved _____

MAIN OFFICE AND LABORATORY · POST OFFICE BOX 650 · BRIDGEPORT, WEST VIRGINIA 26330 · (304) 623-6549
CHARLESTON FIELD OFFICE · POST OFFICE BOX 8337 · SOUTH CHARLESTON, WEST VIRGINIA 25303-0337 · (304) 744-9864

Sturm Environmental Services

JOHN W. STURM, PRESIDENT

COMPANY: PRECISION OIL & GAS, INC.

SAMPLE ID: TARIFF USDW H. BOGGS

SAMPLED BY: B. JONES

DATE/TIME SAMPLED:* 11-29-17 1350

DATE/TIME RECEIVED: 11-30-17 1222

LABORATORY ID: POG 171130-2

PARAMETER	TEST RESULTS	UNITS	METHOD	METHOD DETECTION LIMIT	DATE/TIME ANALYZED	ANALYST
*FIELD pH	7.4	units			11-29-17 1350	BJ
*FIELD TEMP	50	°F			11-29-17 1350	BJ
pH O	8.2	units	SM 22nd 4500 H B	.1	12-01-17 1540	KH
Fe	.58	mg/L	EPA 200.7 Rev 4.4-1994	.02	12-05-17 0745	DB
TDS	3.34 J	mg/L	SM22nd 2540 C	4	12-04-17 1459	MRS
Cl-	61.0	mg/L	EPA 300.0 Rev 2.1-1993	.50	12-04-17 2222	DC
MBAS	.01	mg/L	SM22nd 5540C	.01	11-30-17 2350	SW

*Client Provided

**See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

Data Qualifiers

B Analyte found in reagent blank. Indicates possible reagent or background contamination.
E Estimated Reported value exceeded calibration range.
J Reported value is an estimate because concentration is less than reporting limit.
PND Precision not determined.
R Sample results rejected because of gross deficiencies in QC or method performance. Re-sampling and/or re-analysis is necessary.
RND Recovery not determined.
U Compound was analyzed for, but not detected.
O Out of holding. Time does not meet 40 CFR 136/141 compliance.
T This result is not supported by our certification ID.
A Does not meet 40 CFR 136/141 compliance.
C Does not meet 47 CSR 32 compliance.

Narrative:

Approved _____

MAIN OFFICE AND LABORATORY—POST OFFICE BOX 650 • BRIDGEPORT, WEST VIRGINIA 26330 • (304) 623-6549
CHARLESTON FIELD OFFICE—POST OFFICE BOX 8337 • SOUTH CHARLESTON, WEST VIRGINIA 25303-0337 • (304) 744-9864

Sturm Environmental Services

JOHN W. STURM, PRESIDENT

COMPANY: PRECISION OIL & GAS, INC.

SAMPLE ID: TARIFF USDW W. DEWEESE

SAMPLED BY: B. JONES

DATE/TIME SAMPLED:* 11-29-17 1434

DATE/TIME RECEIVED: 11-30-17 1222

LABORATORY ID: POG 171130-3

PARAMETER	TEST RESULTS	UNITS	METHOD	METHOD DETECTION LIMIT	DATE/TIME ANALYZED	ANALYST
*FIELD pH	7.4	units			11-29-17 1434	BJ
*FIELD TEMP	54	°F			11-29-17 1434	BJ
pH O	8.2	units	SM 22nd 4500 H B	.1	12-01-17 1540	KH
Fe	.34	mg/L	EPA 200.7 Rev 4.4-1994	.02	12-05-17 0745	DB
TDS	267 J	mg/L	SM22nd 2540 C	4	12-04-17 1459	MRS
Cl^-	53.0	mg/L	EPA 300.0 Rev 2.1-1993	.50	12-04-17 2222	DC
MBAS	.01	mg/L	SM22nd 5540C	.01	11-30-17 2350	SW

*Client Provided

**See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

Data Qualifiers

B Analyte found in reagent blank. Indicates possible reagent or background contamination.
E Estimated Reported value exceeded calibration range.
J Reported value is an estimate because concentration is less than reporting limit.
PND Precision not determined.
R Sample results rejected because of gross deficiencies in QC or method performance. Re-sampling and/or re-analysis is necessary.
RND Recovery not determined.
U Compound was analyzed for, but not detected.
O Out of holding. Time does not meet 40 CFR 136/141 compliance.
T This result is not supported by our certification ID.
A Does not meet 40 CFR 136/141 compliance.
C Does not meet 47 CSR 32 compliance.

Narrative:

Approved _____

Sturm Environmental Services

JOHN W. STURM, PRESIDENT

COMPANY: PRECISION OIL & GAS, INC.

SAMPLE ID: TARIFF USDW D. KEEN

SAMPLED BY: B. JONES

DATE/TIME SAMPLED:* 11-29-17 1530

DATE/TIME RECEIVED: 11-30-17 1222

LABORATORY ID: POG 171130-4

PARAMETER	TEST RESULTS	UNITS	METHOD	METHOD DETECTION LIMIT	DATE/TIME ANALYZED	ANALYST
*FIELD pH	6.7	units			11-29-17 1530	BJ
*FIELD TEMP	5.6	°F			11-29-17 1530	BJ
pH O	7.8	units	SM 22nd 4500 H B	.1	12-01-17 1540	KH
Fe	2.14	mg/L	EPA 200.7 Rev 4.4-1994	.02	12-05-17 0745	DB
TDS	210 J	mg/L	SM22nd 2540 C	4	12-04-17 1459	MRS
Cl-	31.0	mg/L	EPA 300.0 Rev 2.1-1993	.50	12-04-17 2222	DC
MBAS	U	mg/L	SM22nd 5540C	.01	11-30-17 2350	SW

*Client Provided

**See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

Data Qualifiers

B Analyte found in reagent blank. Indicates possible reagent or background contamination.
E Estimated Reported value exceeded calibration range.
J Reported value is an estimate because concentration is less than reporting limit.
PND Precision not determined.
R Sample results rejected because of gross deficiencies in QC or method performance. Re-sampling and/or re-analysis is necessary.
RND Recovery not determined.
U Compound was analyzed for, but not detected.
O Out of holding. Time does not meet 40 CFR 136/141 compliance.
T This result is not supported by our certification ID.
A Does not meet 40 CFR 136/141 compliance.
C Does not meet 47 CSR 32 compliance.

Narrative:

Approved Doyle W. Sturm

STURM ENVIRONMENTAL SERVICES

CHAIN OF CUSTODY RECORD

Main Office:
STURM ENVIRONMENTAL SERVICES
BRUSHY FORK ROAD
P.O. BOX 650
BRIDGEPORT, WV 26330
PHONE: 304-623-6549
FAX: 304-623-6552

STURM ENVIRONMENTAL SERVICES
610 D STREET
P.O. BOX 8337
SO. CHARLESTON, WV 25303
PHONE: 304-744-9864
FAX: 304-744-7866

REPORT TO:
Client Name: Precision Oil + Gas, Inc.
Address: P.O. Box 884
City/State/Zip: Bridgeport, WV 26330
Contact Person: Blake Jones
Telephone Number: 304-848-0307 Fax No. 304-848-0309
Email Address: bjones42@gmail.com
Sampler Name (Print): Blake Jones
Sampler Signature: [signature]
Project Name: Tariff USDW
Special Reporting: [X] Email Results [ ] Fax Results

BILL TO:
Client Name: Precision Oil + Gas, Inc.
Address: P.O. Box 884
City/State/Zip: Bridgeport, WV 26330
Contact Person: Blake Jones
Telephone Number: 304-848-0707 Fax No. 304-848-0309
Email Address: bjones42@gmail.com
Purchase Order #:
TURN AROUND TIME: X Standard
____ RUSH (pre-scheduled; surcharges may apply) Please Check One: 1 DAY [ ] 2 DAY [ ] 3 DAY [ ]
____ Date Needed

Sample ID / Description	Composite Sample: Start Date	Start Time	End Date	End Time	Grab Sample: Date	Time	ES	Preservative: Other	HCl	NaOH	H_2SO_4, Plastic	H_2SO_4, Glass	None	HNO_3	Matrix: Groundwater	Wastewater	Drinking Water	Sludge	Soil	Other (specify)	Analyze For: Mc Detail	# of Bottles	Field Flow (gpm, cfs, mgd)	Field pH	Field Conductivity	Field DO	Field Chlorine (mg/L or ug/L)	Field Temp (°F or °C)
L. Snodgrass					11/29	1:15pm	X						X	X							X	3		7.6				54°
H. Boggs					11/29	1:59pm	X						X	X							X	3		7.4				50°
W. DeWeese					11/29	2:54pm	X						X	X							X	3		7.9				54°
D. Keen					11/29	3:30pm	X						X	X							X	3		6.7				56°

Comments:

Records retained for 5 years

Relinquished by:	Date	Time	Received by:	Date	Time
[signature]	11/30/17	1222	K. Kuhl [signature]	11/30/17	1222
Relinquished by:	Date	Time	Received by:	Date	Time

Laboratory Comments:
Temperature Upon Receipt: <6
Sample Preserved? (Y) N
Comment #

Section 8
Geological Data

Section 8
Geologic Information

Historical references indicate that the Tariff Field was first drilled in1909. Primary production occurred between 1910 and 1950. Secondary recovery injection using gas began 1951. Secondary recovery injection using water began in 1978 and was expanded in 1983.

Injection Zone

The injection zone within the Tariff Field is the Big Injun Sandstone, a member of the Greenbrier Group of Mississippian age. It ranges in depth from 1,900 to 2,180 feet averaging 2,098 feet and ranges in thickness from 17 to 40 feet averaging 28 feet. Porosity ranges from 13.6% to 22.2% averaging 17.2%. Permeability ranges up to 20md. It is described as a light gray to green, moderate to well sorted, fine to medium grained, subangular, argillaceous sandstone. It is cemented with calcite and/or dolomite and displays varying degrees of friability depending on the degree of cementation. The reservoir is bounded by a pinch-out on the north and east and by a gas cap on the south and west.

Confining Zone

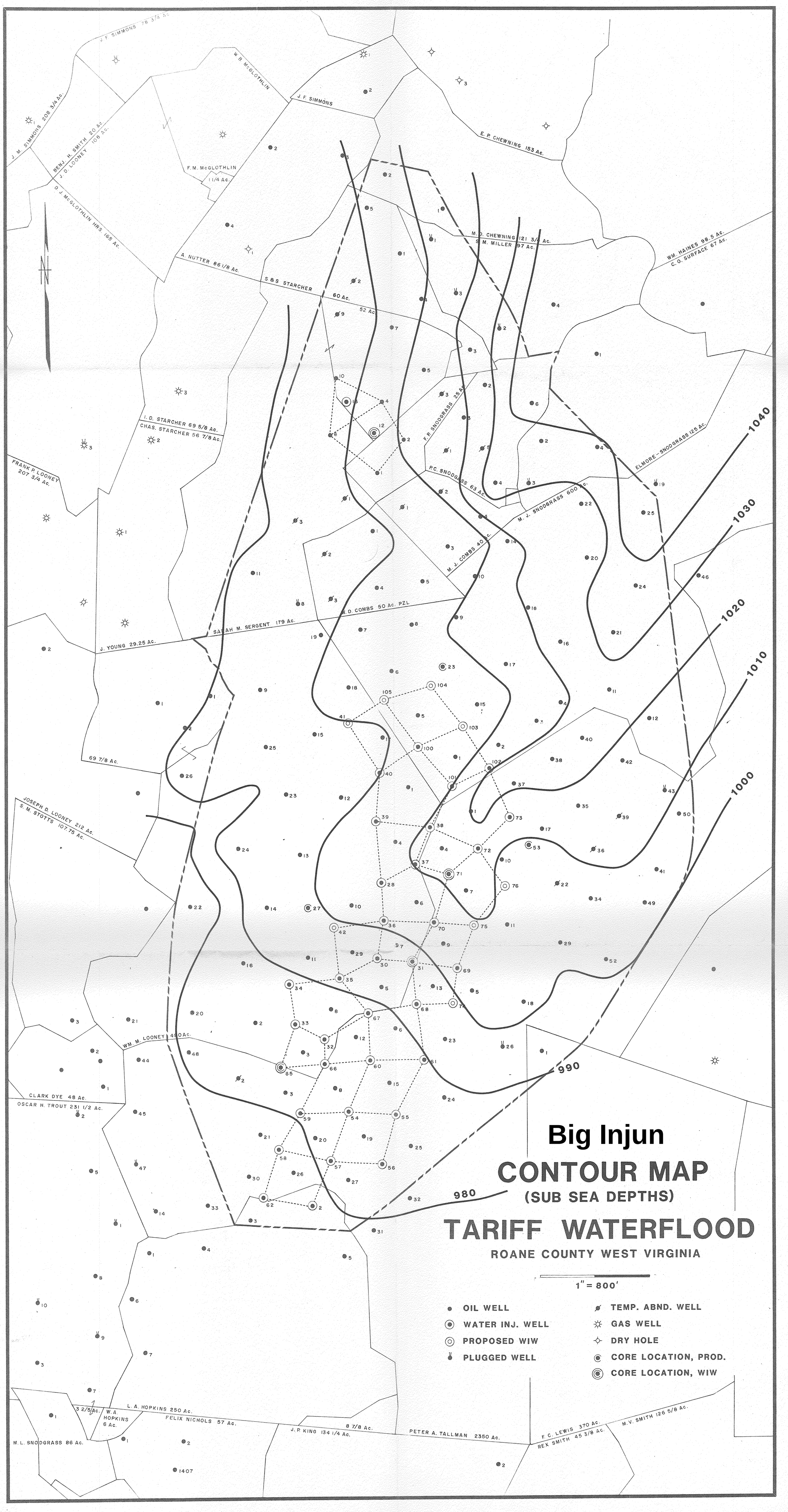
The confining zone within the Tariff Field is the Greenbriar Limestone (Big Lime). Like the Big Injun Sandstone, it is a member of the Greenbrier Group of Mississippian age. It ranges in depth from 1,795 to 2,072 feet averaging 1,971 feet and ranges in thickness from 70 to 115 feet averaging 105 feet. In several of the drill records a secondary confining zone identified below the Greenbriar Limestone as the Keener Sandstone, a dense dolomitic unit also identified as the Loyalhanna Dolomite. This unit occurs sporadically but may be over 70 feet in thickness. The Big Injun injection zone is underlain by the Pocono Shale.

Local Structural Geology

There are no known faults within the Tariff Field. The geologic structure within the field is dominated by the Robinson syncline with an axis trending North-Northeast and South-Southwest extending through the eastern half of the field plunging North-Northeast at approximately 30 feet per mile. Dip toward the syncline axis is approximately 45 feet per mile

Statement of Seismic Risk

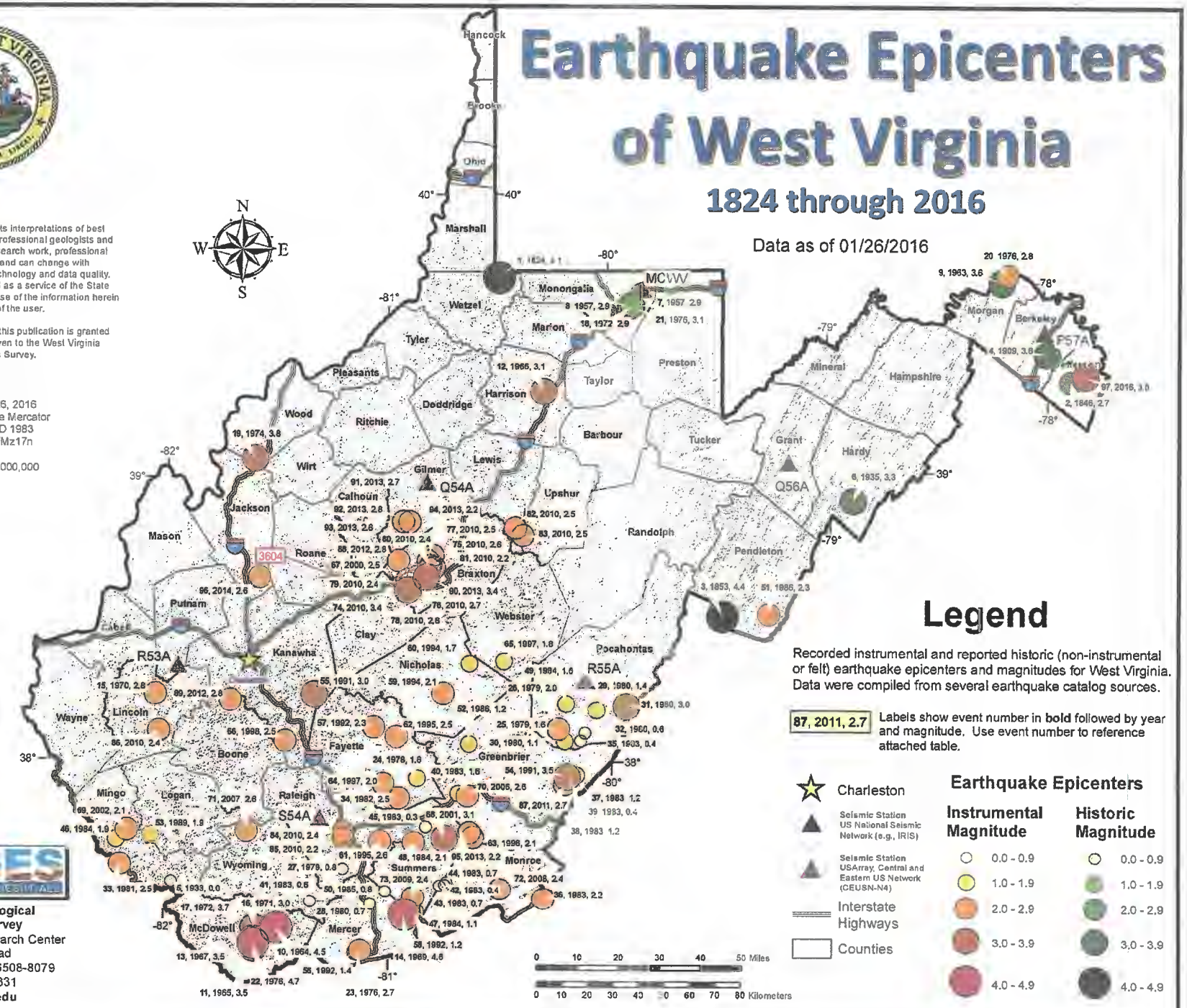
West Virginia, in general has a low seismic risk. There is no record of any earthquakes within the Tariff Field. According to WVGES records, the closest earthquake occurred 13 miles east in Braxton County on January 10, 2012 with a magnitude of 2.8. According to USGS data, the probability of an earthquake occurring in the local area of Tariff Field is 1% over the next 50 years.


J. F. SIMMONS 78 3/4 Ac.
W. B. McGLOTHLIN
J. F. SIMMONS
E. P. CHEWNING 153 Ac.
J. M. SIMMONS 208 3/4 Ac.
BENJ. H. SMITH 20 Ac.
J. D. LOONEY 108 3/4 Ac.
F. M. McGLOTHLIN 11/4 Ac.
O. J. McGLOTHLIN HRS 165 Ac.
M. O. CHEWNING 121 3/4 Ac.
S. M. MILLER 97 Ac.
WM. HAINES 98.5 Ac.
C. O. SURFACE 67 Ac.
A. NUTTER 86 1/8 Ac.
S & S STARCHER 60 Ac.
52 Ac.
I. D. STARCHER 69 5/8 Ac.
CHAS. STARCHER 56 7/8 Ac.
F. P. SNODGRASS 25.5 Ac.
ELMORE-SNODGRASS 125 Ac.
P. C. SNODGRASS 63 Ac.
M. J. SNODGRASS 600 Ac.
FRANK P. LOONEY 207 3/4 Ac.
M. J. COMBS 40 Ac.
W. D. COMBS 50 Ac. PZL
SARAH M. SERGENT 179 Ac.
J. YOUNG 29.25 Ac.
69 7/8 Ac.
JOSEPH D. LOONEY 212 Ac.
S. M. STOTTS 107.75 Ac.
WM. M. LOONEY 450 Ac.
CLARK DYE 48 Ac.
OSCAR H. TROUT 231 1/2 Ac.
L. A. HOPKINS 250 Ac.
3 2/5 Ac.
W. A. HOPKINS 6 Ac.
FELIX NICHOLS 57 Ac.
8 7/8 Ac.
J. P. KING 134 1/4 Ac.
PETER A. TALLMAN 2350 Ac.
F. C. LEWIS 370 Ac.
REX SMITH 45 3/8 Ac.
M. V. SMITH 126 5/8 Ac.
M. L. SNODGRASS 86 Ac.
1407
1040
1030
1020
1010
1000
990
980
N
Big Injun
CONTOUR MAP
(SUB SEA DEPTHS)
TARIFF WATERFLOOD
ROANE COUNTY WEST VIRGINIA
1" = 800'
OIL WELL
WATER INJ. WELL
PROPOSED WIW
PLUGGED WELL
TEMP. ABND. WELL
GAS WELL
DRY HOLE
CORE LOCATION, PROD.
CORE LOCATION, WIW

Earthquake Epicenters of West Virginia

1824 through 2016

Data as of 01/26/2016



Legend

Recorded instrumental and reported historic (non-instrumental or felt) earthquake epicenters and magnitudes for West Virginia. Data were compiled from several earthquake catalog sources.

87, 2011, 2.7 Labels show event number in **bold** followed by year and magnitude. Use event number to reference attached table.

- Charleston
- Seismic Station US National Seismic Network (e.g., IRIS)
- Seismic Station USArray, Central and Eastern US Network (CEUSN-N4)
- Interstate Highways
- Counties

Earthquake Epicenters

Instrumental Magnitude	Historic Magnitude
0.0 - 0.9	0.0 - 0.9
1.0 - 1.9	1.0 - 1.9
2.0 - 2.9	2.0 - 2.9
3.0 - 3.9	3.0 - 3.9
4.0 - 4.9	4.0 - 4.9

Publications Policy:

This publication represents interpretations of best available data made by professional geologists and geographers. As in all research work, professional interpretations may vary, and can change with advancements in both technology and data quality. This publication is offered as a service of the State of West Virginia; proper use of the information herein is the sole responsibility of the user.

Map Date: January 26, 2016
Projection: Transverse Mercator
Horizontal Datum: NAD 1983
Coordinate System: UTMz17n
Map scale for full 8.5" x 11" display: 1:2,000,000

West Virginia Geological and Economic Survey
Mont Chateau Research Center
1 Mont Chateau Road
Morgantown, WV 26508-8079
Phone: (304) 594-2331
www.wvgs.wvnet.edu

Event Num	WVEQID	County	UTC Year	UTC Month	UTC Day	UTC HH	UTC MM	UTC SS	Latitude (N)	Longitude (W)	Magnitude	Recorded	MMI	Magnitude Type	Source 1	Source 2	USGS Link
1	18240715160	Wood	1824	7	15	16	20	0.00	39.70000	-80.50000	4.1	Historic	4.0	Mb	VTSO	NCEER	
2	18461019020	Jefferson	1846	10	19	2	0	0.00	39.30000	-77.90000	2.7	Historic	3.0	<NULL>	VTSO	<NULL>	
3	18530502140	Pendleton	1853	5	2	14	20	0.00	38.50000	-79.50000	4.4	Historic	5.5	<NULL>	NCEER	Wheeler I-2737	
4	19090402070	Berkeley	1909	4	2	7	25	0.00	39.40000	-78.00000	3.6	Historic	5.0	Mb	VTSO	Wheeler I-2737	
5	19330615010	Mingo	1933	6	15	1	14	36.80	37.56800	-81.97300	0.0	Historic	0.0	<NULL>	VTSO	<NULL>	
6	19351101080	Hardy	1935	11	1	8	30	0.00	38.90000	-78.90000	3.3	Historic	4.0	<NULL>	VTSO	NCEER	
7	19570307210	Monongalia	1957	3	7	21	5	9.00	39.60000	-79.90000	2.9	Historic	3.0	Mb	VTSO	<NULL>	
8	19570313210	Monongalia	1957	3	13	21	0	41.00	39.60000	-79.90000	2.9	Historic	3.0	Mb	VTSO	<NULL>	
9	19631010000	Morgan	1963	10	10	0	0	0.00	39.65500	-78.19700	3.6	Historic	0.0	<NULL>	Wheeler I-2737	<NULL>	
10	19641125020	McDowell	1964	11	25	2	50	5.00	37.40000	-81.50000	4.5	Instrumental	0.0	Mb	ANSS	<NULL>	
11	19650426150	McDowell	1965	4	26	15	26	19.70	37.32500	-81.60200	3.5	Instrumental	0.0	MbLg	VTSO	NCEER	
12	19660928000	Harrison	1966	9	28	0	0	0.00	39.30000	-80.30000	3.1	Instrumental	4.0	<NULL>	NCEER	<NULL>	
13	19671216120	McDowell	1967	12	16	12	23	33.40	37.36000	-81.60400	3.5	Instrumental	0.0	Mb	VTSO	NCEER	
14	19691120010	Mercer	1969	11	20	1	0	9.30	37.44900	-80.93200	4.6	Instrumental	6.0	MbLg	VTSO	NCEER	
15	19700811060	Lincoln	1970	8	11	6	14	25.50	38.23000	-82.05000	2.8	Instrumental	4.0	MbLg	VTSO	NCEER	
16	19710401050	McDowell	1971	4	1	5	5	11.00	37.40000	-81.60000	3.0	Instrumental	0.0	Mb	NCEER	ANSS	
17	19720109230	McDowell	1972	1	9	23	24	29.00	37.40000	-81.60000	3.7	Instrumental	0.0	MbLg	NCEER	ANSS	
18	19720912150	Monongalia	1972	9	12	15	17	13.70	39.60000	-79.90000	2.9	Historic	3.0	Mb	VTSO	NCEER	
19	19741020150	Wood	1974	10	20	15	13	55.60	39.06000	-81.60900	3.8	Instrumental	5.0	Mb	VTSO	NCEER	Further Info
20	19760130180	Morgan	1976	1	30	18	58	49.80	39.68300	-78.17000	2.8	Instrumental	0.0	Lg	USGS	ANSS	Further Info
21	19760506180	Monongalia	1976	5	6	18	46	8.10	39.60000	-79.90000	3.1	Historic	4.0	Mb	VTSO	NCEER	
22	19760619050	McDowell	1976	6	19	5	54	13.40	37.34400	-81.60200	4.7	Instrumental	5.0	Mb	VTSO	NCEER	Further Info
23	19760703200	Mercer	1976	7	3	20	53	45.80	37.32000	-81.13000	2.7	Instrumental	0.0	MbLg	VTSO	<NULL>	
24	19780814040	Fayette	1978	8	14	4	50	5.40	37.93900	-80.87400	1.6	Instrumental	0.0	Mc	VTSO	ANSS	
25	19790916090	Pocahontas	1979	9	16	9	39	22.60	38.09900	-80.24000	1.6	Instrumental	0.0	Mc	ANSS	<NULL>	
26	19790919000	Pocahontas	1979	9	19	0	45	57.40	38.11000	-80.24300	2.0	Instrumental	0.0	Mc	ANSS	<NULL>	
27	19791031080	Raleigh	1979	10	31	8	32	47.30	37.61700	-81.20700	0.8	Instrumental	0.0	Mc	ANSS	<NULL>	
28	19800410220	Mercer	1980	4	10	22	33	15.70	37.48700	-81.08600	0.7	Instrumental	0.0	Mc	VTSO	ANSS	
29	19800921100	Pocahontas	1980	9	21	10	2	46.30	38.17500	-80.07000	1.4	Instrumental	0.0	Mc	VTSO	ANSS	
30	19801016030	Pocahontas	1980	10	16	3	48	7.60	38.06600	-80.21500	1.1	Instrumental	0.0	Mc	VTSO	ANSS	
31	19801105210	Pocahontas	1980	11	5	21	48	14.20	38.18800	-79.93600	3.0	Instrumental	0.0	ML	ANSS	<NULL>	
32	19801125070	Pocahontas	1980	11	25	7	44	4.00	38.09500	-80.12300	0.6	Instrumental	0.0	Md	VTSO	ANSS	
33	19811130170	Mingo	1981	11	30	17	33	11.00	37.63000	-82.20000	2.5	Instrumental	0.0	Mc	VTSO	ANSS	
34	19820623160	Fayette	1982	6	23	16	17	34.10	37.87000	-80.95700	2.5	Instrumental	0.0	Md	VTSO	ANSS	
35	19830121050	Pocahontas	1983	1	21	5	33	20.40	38.06700	-80.14400	0.4	Instrumental	0.0	Md	VTSO	ANSS	
36	19830526010	Monroe	1983	5	26	1	4	44.80	37.50600	-80.31600	2.2	Instrumental	0.0	Md	VTSO	ANSS	
37	19830610000	Greenbrier	1983	6	10	0	18	40.40	37.94800	-80.16300	1.2	Instrumental	0.0	Md	VTSO	ANSS	
38	19830610001	Greenbrier	1983	6	10	0	24	57.00	37.95100	-80.18900	1.2	Instrumental	0.0	Md	VTSO	ANSS	
39	19830610002	Greenbrier	1983	6	10	0	31	8.30	37.93800	-80.16800	0.4	Instrumental	0.0	Md	VTSO	ANSS	
40	19830720040	Greenbrier	1983	7	20	4	41	40.90	37.88500	-80.69100	1.6	Instrumental	0.0	Md	VTSO	ANSS	
41	19830725030	Wyoming	1983	7	25	3	27	0.20	37.49600	-81.35200	0.6	Instrumental	0.0	Md	VTSO	ANSS	
42	19831113160	Summers	1983	11	13	16	51	6.70	37.55600	-80.77500	0.4	Instrumental	0.0	Md	VTSO	ANSS	
43	19831113170	Monroe	1983	11	13	17	50	50.10	37.55900	-80.75300	0.7	Instrumental	0.0	Md	VTSO	ANSS	
44	19831125160	Monroe	1983	11	25	16	27	47.80	37.56800	-80.74500	0.7	Instrumental	0.0	Md	VTSO	<NULL>	
45	19831223100	Summers	1983	12	23	10	51	21.90	37.76600	-80.83700	0.3	Instrumental	0.0	Md	VTSO	ANSS	
46	19840202050	Mingo	1984	2	2	5	10	19.70	37.71700	-82.21800	1.9	Instrumental	0.0	Md	VTSO	ANSS	
47	19840311040	Summers	1984	3	11	4	1	38.90	37.47400	-80.90000	1.1	Instrumental	0.0	Md	VTSO	ANSS	
48	19841009050	Summers	1984	10	9	5	33	31.50	37.71300	-80.89100	2.1	Instrumental	0.0	Md	VTSO	ANSS	
49	19841221130	Pocahontas	1984	12	21	13	12	21.90	38.19800	-80.20800	1.6	Instrumental	0.0	Md	VTSO	ANSS	
50	19850614070	Mercer	1985	6	14	7	57	10.20	37.53400	-81.02000	0.8	Instrumental	0.0	Md	VTSO	ANSS	
51	19860226210	Pendleton	1986	2	26	21	53	20.80	38.50700	-79.29200	2.3	Instrumental	0.0	Md	VTSO	ANSS	
52	19861220080	Greenbrier	1986	12	20	8	13	12.80	38.05800	-80.64300	1.2	Instrumental	0.0	Md	VTSO	ANSS	
53	19890319100	Logan	1989	3	19	10	7	55.80	37.73500	-82.06400	1.9	Instrumental	0.0	Md	VTSO	ANSS	
54	19910422010	Greenbrier	1991	4	22	1	1	20.20	37.94200	-80.20500	3.5	Instrumental	0.0	Md	VTSO	ANSS	Further Info

Event Num	WVGS ID	County	UTC Year	UTC Month	UTC Day	UTC Hour	UTC Min	UTC Sec	Latitude	Longitude	Magnitude	Event Type	Mag	Mag Type	Source	Source 2	USGS Info
55	19910628180	Kanawha	1991	6	28	18	34	58.50	38.23100	-81.63500	3.0	Instrumental	0.0	Mb	VTSO	ANSS	
56	19920329200	Mercer	1992	3	29	20	16	48.20	37.31400	-81.14900	1.4	Instrumental	0.0	Md	VTSO	ANSS	
57	19920506210	Fayette	1992	5	6	21	20	23.90	38.11800	-81.06900	2.3	Instrumental	0.0	Md	VTSO	ANSS	
58	19921124020	Summers	1992	11	24	2	26	50.70	37.45700	-80.88400	1.2	Instrumental	0.0	Md	VTSO	ANSS	
59	19940204070	Nicholas	1994	2	4	7	40	32.40	38.23600	-80.75900	2.1	Instrumental	0.0	Md	VTSO	ANSS	
60	19940619080	Nicholas	1994	6	19	8	36	41.20	38.33900	-80.64000	1.7	Instrumental	0.0	Md	VTSO	ANSS	
61	19951115100	Raleigh	1995	11	15	10	29	24.80	37.71700	-81.04300	2.6	Instrumental	0.0	Md	VTSO	ANSS	
62	19951228230	Fayette	1995	12	28	23	48	30.40	38.08400	-80.96800	2.5	Instrumental	0.0	Md	VTSO	ANSS	
63	19960811090	Greenbrier	1996	8	11	9	11	21.30	37.73100	-80.62800	2.1	Instrumental	0.0	Md	VTSO	ANSS	
64	19970422140	Fayette	1997	2	22	14	32	33.10	37.92100	-81.02700	3.0	Instrumental	<NULL>	Mc	ANSS	<NULL>	
65	19970315050	Webster	1997	3	15	5	56	36.40	38.34700	-80.48400	1.8	Instrumental	<NULL>	Mc	ANSS	<NULL>	
66	19970315050	Kanawha	1998	10	2	10	1	6.90	38.06800	-81.46600	2.5	Instrumental	0.0	Md	VTSO	ANSS	
67	20001016170	Braxton	2000	10	16	17	56	13.80	38.63600	-80.92000	2.5	Instrumental	0.0	Md	VTSO	ANSS	
68	20011204210	Summers	2001	12	4	21	15	13.90	37.72600	-80.75200	3.1	Instrumental	0.0	Mb	VTSO	ANSS	
69	20020327080	Mingo	2002	3	27	8	25	3.30	37.75300	-82.17100	2.1	Instrumental	0.0	Md	VTSO	ANSS	
70	20060711120	Greenbrier	2006	7	11	12	1	43.10	37.87800	-80.64900	2.6	Instrumental	0.0	Mb	CERI	VTSO	
71	20070830120	Wyoming	2007	8	30	12	52	9.34	37.75300	-81.63600	2.6	Instrumental	0.0	Lg GS	CERI	USGS ENS	Further Info
72	20080429010	Monroe	2008	1	29	1	4	26.76	37.54400	-80.50900	2.4	Instrumental	<NULL>	Md	CERI	ANSS	
73	20090411480	Summers	2009	4	11	18	11	9.07	37.51330	-80.89570	2.4	Instrumental	<NULL>	Md	CERI	ANSS	
74	20100404090	Braxton	2010	4	4	9	19	14.01	38.59980	-80.91617	3.4	Instrumental	0.0	MbLg	CERI	USGS ENS	Further Info
75	20100129010	Braxton	2010	4	29	1	36	22.59	38.68567	-80.81483	2.6	Instrumental	0.0	MbLg	CERI	USGS ENS	Further Info
76	20100329120	Braxton	2010	4	29	12	38	53.43	38.64700	-80.87200	2.7	Instrumental	0.0	MbLg	USGS ENS	CERI	Further Info
77	20100429130	Braxton	2010	4	29	23	26	39.47	38.72200	-80.80300	2.5	Instrumental	0.0	Lg GS	CERI	USGS ENS	Further Info
78	20100507100	Braxton	2010	5	7	10	26	3.47	38.60650	-80.91317	2.6	Instrumental	0.0	MbLg	CERI	USGS ENS	Further Info
79	20100508030	Braxton	2010	5	8	3	3	0.62	38.62300	-80.91133	2.4	Instrumental	0.0	Md	CERI	USGS ENS	Further Info
80	20100724090	Braxton	2010	7	24	9	15	44.13	38.67533	-80.82017	2.4	Instrumental	0.0	Md	CERI	USGS ENS	Further Info
81	20100725050	Braxton	2010	7	25	5	48	76.05	38.67900	-80.79700	2.3	Instrumental	0.0	Md	USGS ENS	LDEO	
82	20100815040	Lewis	2010	8	15	4	38	47.36	38.81833	-80.42983	2.5	Instrumental	0.0	Md	CERI	USGS	Further Info
83	20100821030	Upshur	2010	8	21	3	16	21.99	38.79250	-80.39767	2.5	Instrumental	0.0	Md	USGS ENS	LDEO	Further Info
84	20100826040	Raleigh	2010	8	26	4	23	15.19	37.74833	-81.20467	2.4	Instrumental	0.0	Md	CERI	USGS	
85	20100826041	Raleigh	2010	8	26	4	24	58.39	37.72733	-81.22433	2.3	Instrumental	0.0	Md	CERI	USGS ENS	
86	20100913150	Lincoln	2010	9	13	15	8	46.47	38.10000	-82.03400	2.4	Instrumental	0.0	Md	CERI	ANSS	
87	20110825050	Greenbrier	2011	8	25	5	59	13.76	37.91600	-80.21533	2.7	Instrumental	4.0	Md	CERI	USGS	Further Info
88	20120111150	Braxton	2012	1	10	15	32	58.66	38.70400	-80.95900	2.8	Instrumental	4.0	unk	CERI	USGS	Further Info
89	20120316150	Boone	2012	3	16	15	5	55.00	38.21200	-81.71400	2.3	Instrumental	2.0	MbLg	CERI	USGS NEIC	Further Info
90	20130331140	Braxton	2013	3	31	14	1	24.03	38.64500	-80.83317	3.4	Instrumental	3.0	Mw	CERI	USGS NEIC	Further Info
91	20130720110	Gilmer	2013	7	20	11	38	46.18	38.89567	-80.88700	2.7	Instrumental	<NULL>	MbLg	CERI	USGS ENS	Further Info
92	20130730060	Gilmer	2013	7	30	6	9	4.85	38.83933	-80.90867	2.6	Instrumental	<NULL>	Md	CERI	USGS ENS	Further Info
93	20130816110	Gilmer	2013	8	16	11	2	21.04	38.84150	-80.93867	2.6	Instrumental	3.0	MbLg	CERI	USGS ENS	Further Info
94	20131013090	Braxton	2013	10	13	9	20	58.35	38.70117	-80.82417	2.2	Instrumental	<NULL>	Md	CERI	USGS ENS	Further Info
95	20131019080	Greenbrier	2013	10	19	8	41	57.43	37.74767	-80.64333	3.2	Instrumental	<NULL>	Md	CERI	USGS ENS	Further Info
96	20140606220	Jackson	2014	6	6	22	15	40.79	38.64383	-81.58550	2.6	Instrumental	<NULL>	Md	CERI	USGS ENS	Further Info
97	20160117190	Jefferson	2016	1	17	19	12	49.00	39.319	-77.828	3.0	Instrumental	3.0	Ml	LDEO	USGS ENS	

Data as of January 28, 2016. For a more detailed listing, please download the West Virginia Earthquake spreadsheet from WVGES at http://www.wvgs.wvnet.edu/www/earthquakes/seismic.html

If you view this map and data as a PDF, you can click any of the blue hyperlinked text to view further information on a web site.

Please note that USGS Links, above, are considered "beta" at the time of this publication and USGS may change destinations, pages, etc. afterward.

Definition of terms on next page.

FIELD SMITHFIELD DISTRICT

COUNTY ROANE STATE W. VA.

Elev:
KB 1064.40
DF
GL 1054.40

2408

Log Analysis

COMPANY PENNZOIL COMPANY

WELL P. A. TALLMAN #58

FIELD SMITHFIELD DISTRICT

COUNTY ROANE

STATE WEST VIRGINIA

DEPTH	ϕ_F	R_t	Assume R_w = .05 P_{ma} = 2.68 P_F = 1.0	% POROSITY	% WATER	REMARKS
2052-54	22	14			34	
2054-56	21	19			29	
2056-58	19	10			31	
2058-60	19	12			29	
2060-62	17	12			35	SHALEY
2062-64	11	14			51	
2064-66	9	15			60	SHALEY
2066-68	15	11			39	SHALEY
2068-70	18	9			37	SHALEY
2070-72	18	10			35	
2072-74	18	11			34	
2074-76	18	12			32	
2076-78	15	11			41	
2078-80	11	8			67	
2080-82	14	7			54	SHALEY
2082-84	8	7			100	SHALEY
AVG	16%					

DATE 7/24/78

LOCATION PAINTSVILLE

ENGINEER ED BOGDANSKI

SWB-1325-Z

2081

Log Analysis

Schlumberger

COMPANY: PENNZOIL COMPANY
WELL: P.A. TALLMAN #54
FIELD: SMITHFIELD
COUNTY: ROANE
STATE: W.VA.

DEPTH	R T	$\sqrt{RW/RT}$	% POROSITY	% WATER	REMARKS
2142-44	12	.065	16	41	pMA=2.68
2144-46	13	.062	17	36	RW=0.05
2146-48	16	.056	20	28	
2148-50	15	.056	25	22	
2150-52	13	.062	22	28	
2152-54	11	.067	21	32	
2154-56	12	.065	20	33	
2156-58	14	.060	22	27	
2158-60	15	.056	18	31	
2160-62	15	.056	20	28	
2162-64	15	.056	19	29	
2164-66	15	.056	21	27	
2166-68	13	.062	21	30	
2168-70	14	.060	18	33	
2170-72	14	.060	0	67	
2172-74	10	NOTE: MEDIUM INDUCTION VALUE USED AT THIS DEPTH AS IT IS BELOW THE FR OF THE DEEP INDUCTION	13	54	
AVG	13.6				

$S_W = \frac{1}{\phi} \sqrt{\frac{RW}{RT}}$

$\phi = pMA - \phi$

$pMA - \phi$

All interpretations are opinions based on inferences from electrical and other measurements and we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to Clause 4 of our General Terms and Conditions as set out in our current Price Schedule.

DATE: 10/16/77
LOCATION: FAIRMONT
ENGINEER: HARGREAVES

SWS-1329-D

2406

Log Analysis

Schlumberger

COMPANY: PENNZOIL COMPANY

WELL: P. A. TALLMAN #56

FIELD: SMITHFIELD DISTRICT

COUNTY: ROANE

STATE: WEST VIRGINIA

DEPTH	ϕ_D	R_T	S_W	% POROSITY	% WATER	REMARKS
2182-84	18.0	12.0	30			
2184-86	22.5	12.0	24			
2186-88	22.0	12.0	25			
2188-90	22.0	13.0	24			
2190-92	22.0	12.0	25			
2192-94	23.0	13.0	22			
2194-96	25.5	15.0	19			
2196-98	23.0	19.0	19			
2198-2200	22.0	18.0	20			
2200-02	23.5	15.0	20			
2202-04	22.0	12.0	25			
2204-06	21.0	12.0	26			

TOTALS:

H = 24 FT

ϕ AVE = 22.2%

ϕ FT = 5.3

S_W AVE = 23%

S_{HY} AVE = 77%

ASSUME:

R_W = .045 OHM-M

ρ_G = 2.68 GM/CC

ρ_F = 1.0 GM/CC

ANALYSIS FROM REPEAT

NL McCullough

GAMMA RAY LOG

FILING NO.

PERMIT #
47-087-3604

COMPANY PENNZOIL COMPANY

WELL P. A. TALLMAN #61

FIELD TARIFF

COUNTY ROANE STATE WV

LOCATION

DISTRICT: SMITHFIELD
WATERSHED: SYCAMORE FORK
TARIFF QUAD 7.5

SEC. TWP. RGE.

OTHER SERVICES:

PERF.

ELEVATIONS:
KB 1063'
DF 1062'
GL 1058'

PERMANENT DATUM GROUND LEVEL ELEV. 1058'
LOG MEASURED FROM 6' ABOVE GROUND LEVEL
DRILLING MEASURED FROM K.B.

DATE	11-4-82
RUN NO.	ONE
TYPE LOG	GAMMA RAY
DEPTH – DRILLER	2157'
DEPTH – LOGGER	2119'
BOTTOM LOGGED INTERVAL	2116'
TOP LOGGED INTERVAL	1800'
TYPE FLUID IN HOLE	DRY
SALINITY PPM CL.	–
DENSITY LB./GAL.	–
LEVEL	–
MAX. REC. TEMP. DEG. F.	–
OPR. RIG TIME	1 HOUR
RECORDED BY	SMITH
WITNESSED BY	MR. GREENLEES
DISTRICT:	CHARLESTON

RUN NO.	BIT	BORE HOLE RECORD FROM	TO	CASING RECORD SIZE	WGT.	FROM	TO
ONE				8 5/8"		SURF.	331'
				4½"		SURF.	T.D.

FOLD HERE

THIS READING AND LOG CONFORMS TO API RECOMMENDED STANDARD PRACTICE RP-33 (E)

EQUIPMENT DATA

GAMMA RAY

RUN NO.	ONE
TOOL MODEL NO.	5540-0-2
DIAM.	3.5"
DETECT. MODEL NO.	5540-25
TYPE	SCINT.
LENGTH	3"
DIST. TO N. SOURCE	

GENERAL

HOIST TRUCK NO.	1353
INST. TRUCK NO.	1353
TOOL SERIAL NO.	
LOG TICKET NO.	203334

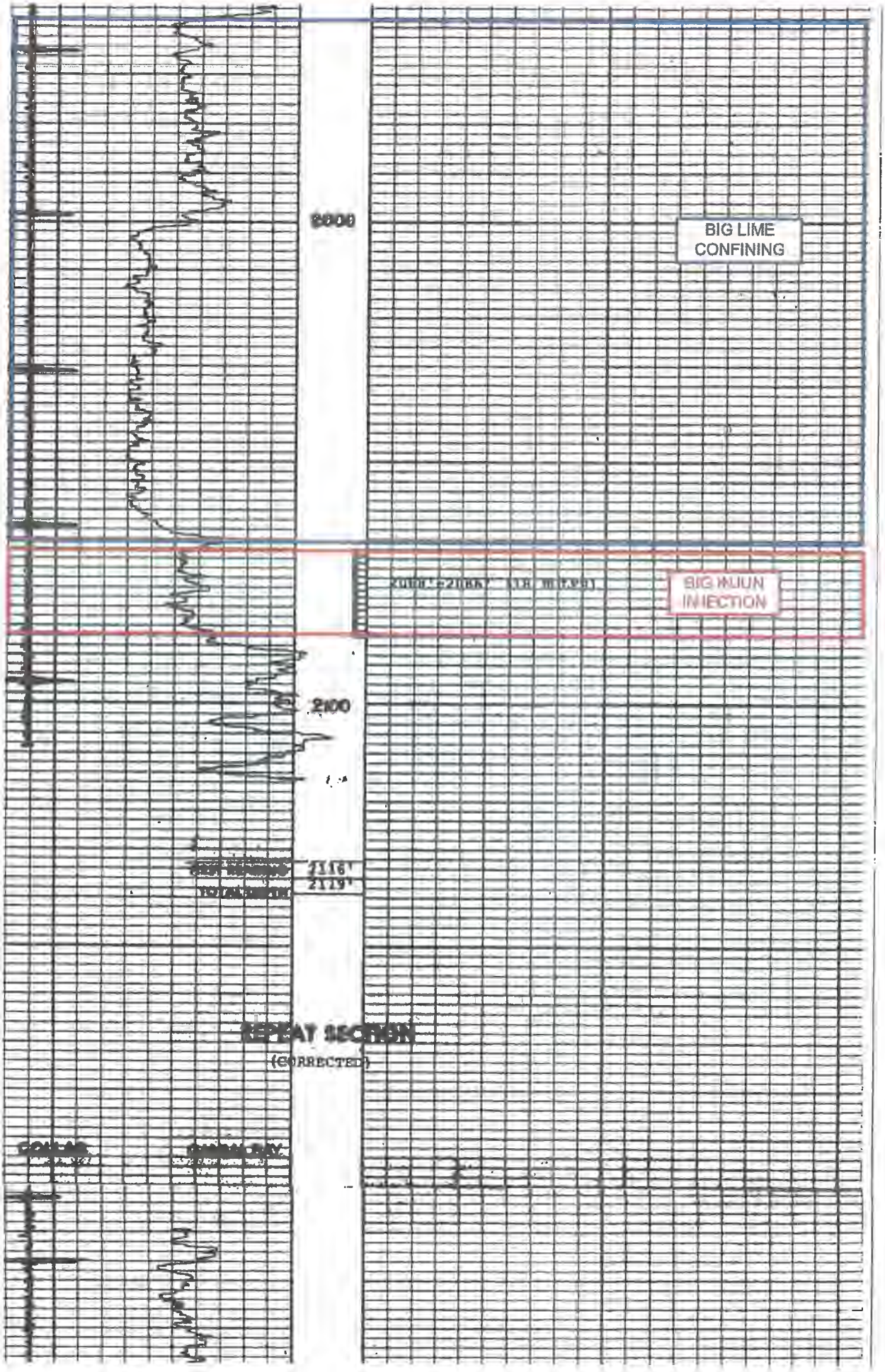
NEUTRON

RUN NO.	
LOG TYPE	
TOOL MODEL NO.	
DIAM.	
DETECT. MODEL NO.	
TYPE	
LENGTH	
SOURCE MODEL NO.	
SERIAL NO.	
SPACING	
TYPE	
STRENGTH	

LOGGING DATA

RUN NO.	GENERAL DEPTHS FROM	TO	SPEED FT./MIN.	T. C. SEC.	GAMMA RAY SCINT. SETTINGS	ZERO DIV. L. OR R.	API GR. UNITS PER LOG DIV.	T. C. SEC.	NEUTRON SCINT. SETTINGS	ZERO DIV. L. OR R.	AM N. UNITS PER LOG DIV.
ONE	2116'	1800'	28'	2	R-5						
					D-400						
					G-500						

REFERENCE LITERATURE:


BIG LIME
CONFINING
BIG INJUN
INJECTION
2100
REPEAT SECTION
(CORRECTED)

WEST VIRGINIA
GEOLOGICAL AND ECONOMIC SURVEY

WVGES
GEOLOGY UNDERLIES IT ALL

1 Mont Chateau Road
Morgantown, WV 26508-8079

Phone: (304) 594-2331
Fax: (304) 594-2575
Web: www.wvges.org

C. Edward Gaunch, *Commerce Cabinet Secretary*
B. Mitchel Blake, Jr., *Director and State Geologist*

August 20, 2020

IN REPLY, REFER TO:

OG/8999/0047/233/2020

Andrew Lockwood
Geologist III
WV Department of Environmental Protection
Office of Oil and Gas
601 57th Street
Charleston, WV 25304

Mr. Lockwood:

I have received the UIC permit (2R8700008AP) request submitted by Ground Resources, LLC requesting permission to initiate secondary recovery operations in the Tariff field, located in northern Roane County.

The Tariff field is nearly bisected by an unnamed syncline that trends in a southwestern to northeastern direction across the field (figure 1). The Arches Fork Anticline is located west of the field and an unnamed anticline is located to the southeast of the field. No known major fault systems exist in close proximity to the field. Located less than 20 miles from the southernmost extent of the Burning Spring Anticline and eastern edge of the Rome Through, some minor seismicity in the Precambrian basement rock can be expected. No know earthquakes have occurred in the Tariff field, with the closest being 13 miles to the east of the field.

The Permit application clearly defines the injection target Big Injun and the overlying Big Lime as the vertical confining zone. There is some concern as there is no mention of how the injected water flood will be contained laterally and to what extent lateral migration may occur. The depths provided in the application for the tops of the Big Injun and Big Lime in the Tariff field are consistent to those in the WVGES oil and gas database. The Big Injun structural top provided in the permit (figure 1 on page 29) is of poor quality and should be provided in higher resolution.

Production from the Big Injun in the Tariff field has been heavy with a large number of existing wells. Included in this are a large number of legacy wells (186) in which little to no information exists (figure 2). Communication between existing wells not included in this project may occur and should be taken into consideration.

The high porosity values provided in the log analysis of this permit along with the known lithology, and structure of the Tariff field appears to be highly conducive for a successful enhanced oil recovery venture

I hope this review helps you with the permitting process. If you have any questions, please feel free to contact me for further information.

Sincerely,

Gary Daft
Geologist III
Oil and Gas Section
gdaft@geosrv.wvnet.edu

Figure1.

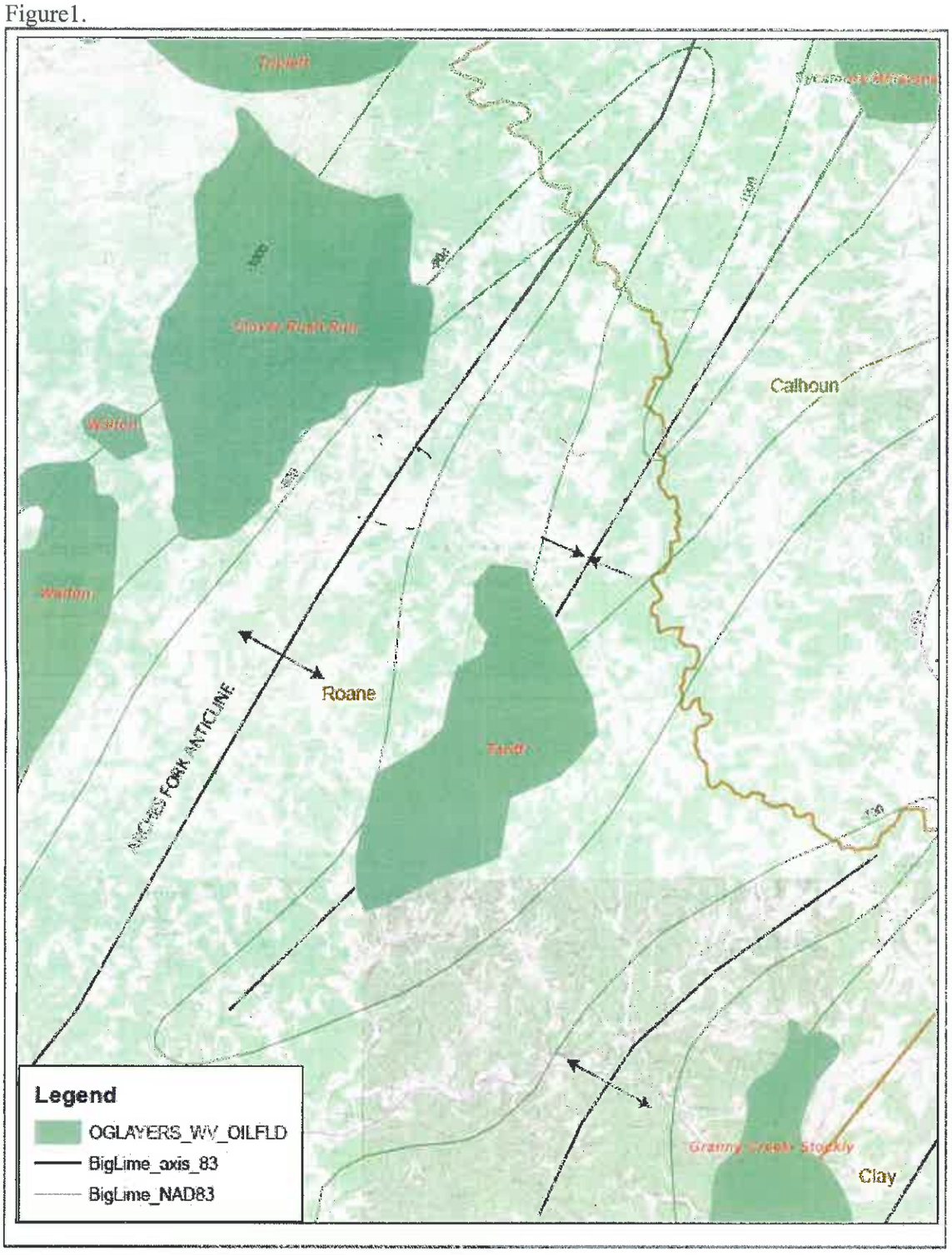
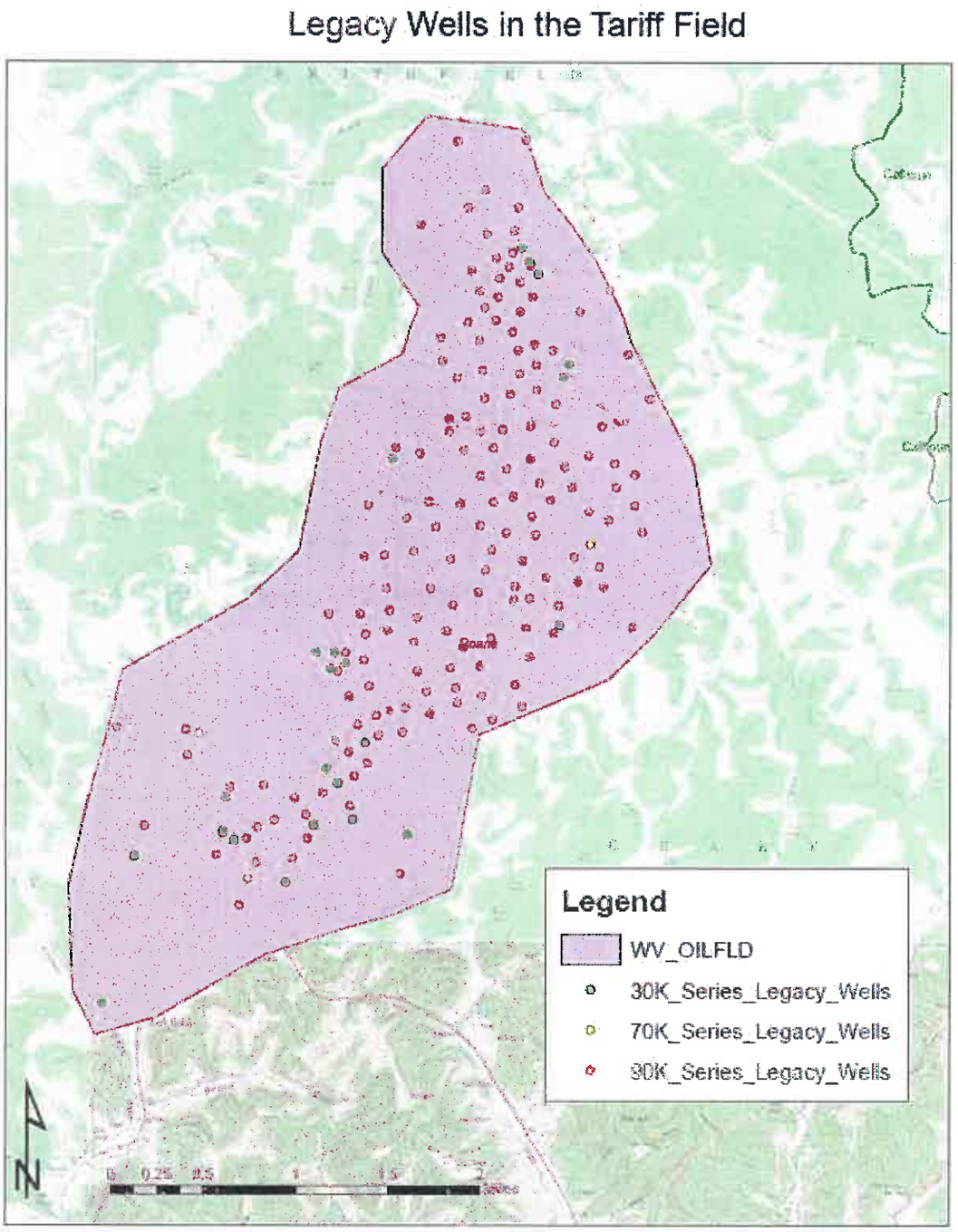

Calhoun
Roane
Clay
Legend
OGLAYERS_WV_OILFLD
BigLime_axis_83
BigLime_NAD83

Figure 2.


Legacy Wells in the Tariff Field
Legend
WV_OILFLD
30K_Series_Legacy_Wells
70K_Series_Legacy_Wells
90K_Series_Legacy_Wells
N

Section 9
Operating Requirements

Section 9

Operating Requirements

1. All proposed operating data is provided in the attached Appendix A forms.

2. There are no brine disposal wells included in this application.

3. The injection fluid is produced water from the Tariff Field. An analysis is attached in this application.

4. No additives will be used at this time.

5. The annulus fluid will be fresh water used to conduct the MIT.

6. Initially only those wells with a tubing and packer system will be used for injection. Additional shut-in wells will be brought online as they are rehabilitated.

7. Only wells with valid MITs for both the well and the injection pipeline will be allowed to operate.

Pace Analytical Services, LLC
225 Industrial Park RD
Beaver, WV 25813
(800)999-0105

Injectate Analysis

November 27, 2019

Missy Hoops
STURM ENVIRONMENTAL SERVICES
P O BOX 650
Bridgeport, WV 26330

RE: Project: 19230
Pace Project No.: 739155
PRECISION OIL & GAS, INC.

Dear Missy Hoops:
Enclosed are the analytical results for sample(s) received by the laboratory on November 22, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Todd Crone
todd.crone@pacelabs.com
800-999-0105
Project Manager

Enclosures

Pace Analytical Services, LLC
225 Industrial Park RD
Beaver, WV 25813
(800)999-0105

CERTIFICATIONS

PRECISION OIL & GAS, INC.
Project: 19230
Pace Project No.: 739155

Pace Analytical Services Beaver
225 Industrial Park Drive, Beaver, WV 25813
Virginia VELAP 460148
Virginia DCLS 00281
West Virginia DEP 060
West Virginia DHHR 00412CM
North Carolina DEQ 466
Kentucky Wastewater Certification KY90039
Pennsylvania DEP 68-00839

Pace Analytical Services, LLC
225 Industrial Park RD
Beaver, WV 25813
(800)999-0105

SAMPLE SUMMARY

PRECISION OIL & GAS, INC.
Project: 19230
Pace Project No.: 739155

Lab ID	Sample ID	Matrix	Date Collected	Date Received
739155001	19230	Water	11/19/19 08:00	11/22/19 17:30

Pace Analytical Services, LLC
225 Industrial Park RD
Beaver, WV 25813
(800)999-0105

SAMPLE ANALYTE COUNT

PRECISION OIL & GAS, INC.
Project: 19230
Pace Project No.: 739155

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
739155001	19230	EPA 8015C	MRF	3	PASI-BVWV
		EPA 8015C	JWK	2	PASI-BVWV
		EPA 8260B	RAB1	8	PASI-BVWV

Pace Analytical Services, LLC
225 Industrial Park RD
Beaver, WV 25813
(800)999-0105

PROJECT NARRATIVE

PRECISION OIL & GAS, INC.
Project: 19230
Pace Project No.: 739155

Method: EPA 8015C
Description: 8015C GCS DRO Water
Client: STURM ENVIRONMENTAL SERVICES
Date: November 27, 2019

General Information:
1 sample was analyzed for EPA 8015C. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3535A with any exceptions noted below.

Initial Calibrations (Including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical
www.pacelabs.com

Pace Analytical Services, LLC
225 Industrial Park RD
Beaver, WV 25813
(800)999-0105

PROJECT NARRATIVE

PRECISION OIL & GAS, INC.
Project: 19230
Pace Project No.: 739155

Method: EPA 8015C
Description: 8015C GCV GRO Water
Client: STURM ENVIRONMENTAL SERVICES
Date: November 27, 2019

General Information:
1 sample was analyzed for EPA 8015C. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, LLC
225 Industrial Park RD
Beaver, WV 25813
(800)999-0105

PROJECT NARRATIVE

PRECISION OIL & GAS, INC.
Project: 19230
Pace Project No.: 739155

Method: EPA 8260B
Description: 8260 MSV UST
Client: STURM ENVIRONMENTAL SERVICES
Date: November 27, 2019

General Information:
1 sample was analyzed for EPA 8260B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 7690

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 739359010

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 43093)
  - Toluene

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

Pace Analytical Services, LLC
225 Industrial Park RD
Beaver, WV 25813
(800)999-0105

ANALYTICAL RESULTS

PRECISION OIL & GAS, INC.
Project: 19230 INJECTION FLUID
Pace Project No.: 739155

Sample: 19230 Lab ID: 739155001 Collected: 11/19/19 08:00 Received: 11/22/19 17:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015C GCS DRO Water	Analytical Method: EPA 8015C Preparation Method: EPA 3535A							
DRO (C10-C28)	1410	ug/L	202	1	11/25/19 10:18	11/25/19 19:21		
ORO (C20-C40)	595	ug/L	202	1	11/25/19 10:18	11/25/19 19:21		
Surrogates								
o-Terphenyl (S)	74	%.	14-126	1	11/25/19 10:18	11/25/19 19:21	84-15-1	
8015C GCV GRO Water	Analytical Method: EPA 8015C							
GRO (C06-C10)	12.0	mg/L	0.50	1		11/25/19 08:11		
Surrogates								
2,5-Dibromotoluene (S)	100	%.	49-147	1		11/25/19 08:11		
8260 MSV UST	Analytical Method: EPA 8260B							
Benzene	437	ug/L	10.0	10		11/27/19 05:24	71-43-2	
Toluene	291	ug/L	10.0	10		11/27/19 05:24	108-88-3	
Ethylbenzene	25.1	ug/L	1.0	1		11/26/19 10:22	100-41-4	
Xylene (Total)	400	ug/L	30.0	10		11/27/19 05:24	1330-20-7	
Surrogates								
Dibromofluoromethane (S)	94	%.	70-130	1		11/26/19 10:22	1868-53-7	
Toluene-d8 (S)	110	%.	70-130	1		11/26/19 10:22	2037-26-5	
4-Bromofluorobenzene (S)	104	%.	70-130	1		11/26/19 10:22	460-00-4	
1,2-Dichloroethane-d4 (S)	103	%.	70-130	1		11/26/19 10:22	17060-07-0	

Pace Analytical Services, LLC
225 Industrial Park RD
Beaver, WV 25813
(800)999-0105

PROJECT NARRATIVE

PRECISION OIL & GAS, INC.
Project: 19230
Pace Project No.: 739155

Method: EPA 8015C
Description: 8015C GCS DRO Water
Client: STURM ENVIRONMENTAL SERVICES
Date: November 27, 2019

General Information:
1 sample was analyzed for EPA 8015C. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3535A with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, LLC
225 Industrial Park RD
Beaver, WV 25813
(800)999-0105

PROJECT NARRATIVE

PRECISION OIL & GAS, INC.
Project: 19230
Pace Project No.: 739155

Method: EPA 8015C
Description: 8015C GCV GRO Water
Client: STURM ENVIRONMENTAL SERVICES
Date: November 27, 2019

General Information:
1 sample was analyzed for EPA 8015C. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, LLC
225 Industrial Park RD
Beaver, WV 25813
(800)999-0105

PROJECT NARRATIVE

PRECISION OIL & GAS, INC.
Project: 19230
Pace Project No.: 739155

Method: EPA 8260B
Description: 8260 MSV UST
Client: STURM ENVIRONMENTAL SERVICES
Date: November 27, 2019

General Information:
1 sample was analyzed for EPA 8260B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 7690

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 739359010

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 43093)
  - Toluene

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

Pace Analytical Services, LLC
225 Industrial Park RD
Beaver, WV 25813
(800)999-0105

ANALYTICAL RESULTS

PRECISION OIL & GAS, INC.
Project: 19230 INJECTION FLUID
Pace Project No.: 739155

Sample: 19230 **Lab ID: 739155001** Collected: 11/19/19 08:00 Received: 11/22/19 17:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015C GCS DRO Water	Analytical Method: EPA 8015C Preparation Method: EPA 3535A							
DRO (C10-C28)	1410	ug/L	202	1	11/25/19 10:18	11/25/19 19:21		
ORO (C20-C40)	595	ug/L	202	1	11/25/19 10:18	11/25/19 19:21		
Surrogates								
o-Terphenyl (S)	74	%.	14-126	1	11/25/19 10:18	11/25/19 19:21	84-15-1	
8015C GCV GRO Water	Analytical Method: EPA 8015C							
GRO (C06-C10)	12.0	mg/L	0.50	1		11/25/19 08:11		
Surrogates								
2,5-Dibromotoluene (S)	100	%.	49-147	1		11/25/19 08:11		
8260 MSV UST	Analytical Method: EPA 8260B							
Benzene	437	ug/L	10.0	10		11/27/19 05:24	71-43-2	
Toluene	291	ug/L	10.0	10		11/27/19 05:24	108-88-3	
Ethylbenzene	25.1	ug/L	1.0	1		11/26/19 10:22	100-41-4	
Xylene (Total)	400	ug/L	30.0	10		11/27/19 05:24	1330-20-7	
Surrogates								
Dibromofluoromethane (S)	94	%.	70-130	1		11/26/19 10:22	1868-53-7	
Toluene-d8 (S)	110	%.	70-130	1		11/26/19 10:22	2037-26-5	
4-Bromofluorobenzene (S)	104	%.	70-130	1		11/26/19 10:22	460-00-4	
1,2-Dichloroethane-d4 (S)	103	%.	70-130	1		11/26/19 10:22	17060-07-0	

Pace Analytical Services, LLC
225 Industrial Park RD
Beaver, WV 25813
(800)999-0105

QUALIFIERS

PRECISION OIL & GAS, INC.
Project: 19230
Pace Project No.: 739155

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-BVW Pace Analytical Services - WestVirginia

Pace Analytical Services, LLC
225 Industrial Park RD
Beaver, WV 25813
(800)999-0105

QUALITY CONTROL DATA CROSS REFERENCE TABLE

PRECISION OIL & GAS, INC.
Project: 19230
Pace Project No.: 739155

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
739155001	19230	EPA 3535A	7598	EPA 8015C	7687
739155001	19230	EPA 8015C	7670		
739155001	19230	EPA 8260B	7690		

Pace Analytical

CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- A

WO#: 739155

739155

ALL

Company: Sturm Environmental

Billing Information:

Address: Po Box 650 Bridgeport, WV 26330

Report To: mhayes@sturmenvironmental.com

Email To:

Copy To:

Site Collection Info/Address:

Customer Project Name/Number:

State: / County/City: Time Zone Collected: [ ] PT [ ] MT [ ] CT [ ] ET

Phone: 304 623-6549

Email:

Site/Facility ID #:

Compliance Monitoring? [ ] Yes [ ] No

Collected By (print): B. Jones

Purchase Order #: 9456

Quote #: 00063882

DW PWS ID #:

DW Location Code:

Collected By (signature):

Turnaround Date Required:

Immediately Packed on Ice: [ ] Yes [ ] No

Sample Disposal: [X] Dispose as appropriate [ ] Return [ ] Archive: ______ [ ] Hold: ______

Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply)

Field Filtered (if applicable): [ ] Yes [ ] No

Analysis: ______

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Container Preservative Type **: 1/3 | 3

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other ______

Analyses

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	TPH - GRO, DRO, ORO	BTEX								
19230	L	G	11/19/19	0800				5	X	X								

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y N NA
Custody Signatures Present	Y N NA
Collector Signature Present	Y N NA
Bottles Intact	Y N NA
Correct Bottles	Y N NA
Sufficient Volume	Y N NA
Samples Received on Ice	Y N NA
VOA - Headspace Acceptable	Y N NA
USDA Regulated Soils	Y N NA
Samples in Holding Time	Y N NA
Residual Chlorine Present	Y N NA
Cl Strips: ______	
Sample pH Acceptable	Y N NA
pH Strips: ______	
Sulfide Present	Y N NA
Lead Acetate Strips: ______	

LAB USE ONLY:

Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: (Wet) Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #: 2371786

Samples received via: FEDEX UPS (Client) Courier Pace Courier

Lab Sample Temperature Info:

Temp Blank Received: Y N NA

Therm ID#: 5

Cooler 1 Temp Upon Receipt: 3.4 oC

Cooler 1 Therm Corr. Factor: -0.1 oC

Cooler 1 Corrected Temp: 3.3 oC

Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	MTJL LAB USE ONLY
K. Kuhl	11-21-19 1500	[signature]	11-21-19/1500	Table #:
[signature]	11-22-19 / 1100	PAG	11/22/19 1100	Acctnum: Template: Prelogin:
[signature]	11-22-19 1400	[signature]	11-22-19 1513	PM: PB:

Trip Blank Received: Y N NA

HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: Page 11 of 12

of: ______

LIMS73 Lab Sample Condition Upon Receipt (West Virginia)

WO#: 739155
PM: DTC Due Date: 12/11/19
CLIENT: STURMENVSER

Pace Analytical

Client Name: _____

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☒ Pace ☐ Other: _____

Tracking #: _____

Custody Seal on Cooler/Box/Containers Present: ☐ yes ☒ no Seals intact: ☐ yes ☐ no

Thermometer Used 13 Type of Ice: Wet Blue None

Cooler Temperature Observed Temp 1.8 °C Correction Factor: +0.3 °C Final Temp: 1.1 °C

Comments:

pH paper Lot#	Date and initials of person examining contents: TW 11-22-19

	Yes	No	N/A	
Chain of Custody Present:	✓			1.
Chain of Custody Filled Out:	✓			2.
Chain of Custody Relinquished:	✓			3.
Sampler Name & Signature on COC:	✓			4.
Sample Labels match COC: -Includes date/time/ID Matrix	✓			5.
Samples Arrived within Hold Time:	✓			6.
Short Hold Time Analysis (<72hr remaining):	✓			7.
Rush Turn Around Time Requested:		✓		8.
Sufficient Volume:	✓			9.
Correct Containers Used:	✓			10.
-Pace Containers Used:	✓			
Containers Intact:	✓			11.
Orthophosphate field filtered:			✓	12.
Hex Cr Aqueous sample field filtered:			✓	13.
-pH adjusted within 24 hours? (If yes, indicate acid lot #)			✓	
Filtered volume received for Dissolved tests:			✓	14.
All containers have been checked for preservation: exceptions: VOA, coliform, O&G, LLMercury, Non-aqueous matrix			✓	15.
All containers meet method preservation requirements:			✓	Initial when completed: TW Date/time samples provided to lab: 11-22-19 1730
				Tests not preserved:
Headspace in VOA Vials:		✓		16.
Trip Blank Present:		✓		17.
Trip Blank Custody Seals Present:		✓		
				Initial when completed: TW Date: 11-22-19

Client Notification/ Resolution:
Person Contacted: _____ Date/Time: _____ Contacted By: _____
Comments/ Resolution: _____

☐ A check in this box indicates that additional information has been stored in ereports.

*PM review is documented electronically in LIMS, when the Project Manager closes the SRF Review schedule in LIMS. The status may be reviewed in the Status section of the Workorder Edit Screen.

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

December 16, 2019

Ms. Laurie Hiles
Sturm Environmental Services
P.O. Box 650
Bridgeport, WV 26330

RE: Project: 19005
Pace Project No.: 30337504
PRECISION OIL & GAS, INC.

Dear Ms. Hiles:
Enclosed are the analytical results for sample(s) received by the laboratory on November 22, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Samantha Bayura
samantha.bayura@pacelabs.com
(724)850-5622
Project Manager

Enclosures

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

CERTIFICATIONS

PRECISION OIL & GAS, INC.
Project: 19005
Pace Project No.: 30337504

Pace Analytical Services Pennsylvania
1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Florida: Cert E871149 SEKS WET
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE SUMMARY

PRECISIOIN OIL & GAS, INC.
Project: 19005
Pace Project No.: 30337504

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30337504001	19005	Water	11/19/19 08:00	11/22/19 09:40

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE ANALYTE COUNT

PRECISION OIL & GAS, INC.
Project: 19005
Pace Project No.: 30337504

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30337504001	19005	EPA 900.0	ERT	2	PASI-PA
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA

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1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

PRECISION OIL & GAS, INC.
Project: 19005
Pace Project No.: 30337504

Method: EPA 900.0
Description: 900.0 Gross Alpha/Beta
Client: Sturm Environmental Sevices
Date: December 16, 2019

General Information:
1 sample was analyzed for EPA 900.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

PRECISION OIL & GAS, INC.
Project: 19005
Pace Project No.: 30337504

Method: EPA 903.1
Description: 903.1 Radium 226
Client: Sturm Environmental Sevices
Date: December 16, 2019

General Information:
1 sample was analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

PRECISION OIL & GAS, INC.
Project: 19005
Pace Project No.: 30337504

Method: EPA 904.0
Description: 904.0 Radium 228
Client: Sturm Environmental Sevices
Date: December 16, 2019

General Information:
1 sample was analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spiken:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

PRECISION OIL & GAS, INC.

Project: 19005 INJECTION FLUID

Pace Project No.: 30337504

Sample: 19005 Lab ID: 30337504001 Collected: 11/19/19 08:00 Received: 11/22/19 09:40 Matrix: Water

PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Gross Alpha	EPA 900.0	1,012 ± 576 (839) C:NA T:NA	pCi/L	12/04/19 18:49	12587-46-1	
Gross Beta	EPA 900.0	980 ± 792 (1,435) C:NA T:NA	pCi/L	12/04/19 18:49	12587-47-2	
Radium-226	EPA 903.1	203 ± 60.0 (10.6) C:NA T:97%	pCi/L	12/13/19 14:36	13982-63-3	
Radium-228	EPA 904.0	438 ± 86.8 (28.3) C:95% T:82%	pCi/L	12/12/19 14:18	15262-20-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

PRECISION OIL & GAS, INC.
Project: 19005
Pace Project No.: 30337504

QC Batch: 373342
QC Batch Method: EPA 900.0
Associated Lab Samples: 30337504001

Analysis Method: EPA 900.0
Analysis Description: 900.0 Gross Alpha/Beta

METHOD BLANK: 1811764
Associated Lab Samples: 30337504001

Matrix: Water

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Gross Alpha	0.166 ± 0.196 (0.360) C:NA T:NA	pCi/L	12/04/19 17:57	
Gross Beta	0.036 ± 0.349 (0.696) C:NA T:NA	pCi/L	12/04/19 17:57	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

PRECISION OIL & GAS, INC.
Project: 19005
Pace Project No.: 30337504

QC Batch: 373629 Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 Analysis Description: 903.1 Radium-226
Associated Lab Samples: 30337504001

METHOD BLANK: 1812947 Matrix: Water
Associated Lab Samples: 30337504001

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	-0.0215 ± 0.258 (0.534) C:NA T:92%	pCi/L	12/13/19 14:05	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

PRECISION OIL & GAS, INC.
Project: 19005
Pace Project No.: 30337504

QC Batch: 373628 Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228
Associated Lab Samples: 30337504001

METHOD BLANK: 1812945 Matrix: Water
Associated Lab Samples: 30337504001

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.355 ± 0.347 (0.709) C:75% T:83%	pCi/L	12/12/19 11:15	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALIFIERS

PRECISION OIL & GAS, INC.
Project: 19005
Pace Project No.: 30337504

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.
Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-PA Pace Analytical Services - Greensburg

Pace Analytical®
www.pacelabs.com

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

WO#: 30337504

30337504

Page: of

1756249

Section A
Required Client Information:

Company: Sturm Environmental
Address: P.O Box 650
Bridgeport, WV 26330
Email To:
Phone: 304-623-6549 Fax:
Requested Due Date/TAT:

Section B
Required Project Information:

Report To: Mhoops@sturmenvironmental.com
Copy To:
Purchase Order No.: 8455
Project Name:
Project Number:

Address:
Pace Quote Reference: 00064219
Pace Project Manager: T. Crone
Pace Profile #:

REGULATORY AGENCY
NPDES | GROUND WATER | DRINKING WATER
UST | RCRA | OTHER

Site Location
STATE:

Section D
Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Matrix Codes	MATRIX / CODE
Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Tissue	TS
Other	OT

Requested Analysis Filtered (Y/N): N N N N

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test	Radium 226	Radium 228	Gross Alpha	Gross Beta								Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	19005	OT	G			11/19/19	0800		3			X							X	X	X	X								N	001
2																															
3																															
4																															
5																															
6																															
7																															
8																															
9																															
10																															
11																															
12																															

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	K Kuchel / Sturm Environmental	11/21/19	PM	SWPL Pace	11/[illegible]/19	0940	n/a	N	N	Y

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: B. Jones
SIGNATURE of SAMPLER:
DATE Signed (MM/DD/YY):

F-ALL-Q-020rev.07, 15-May-2007

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

Pittsburgh Lab Sample Condition Upon Receipt

Pace Analytical Client Name: Stuart Environmental Project # 30337504

Courier: ☐ Fed Ex ☑ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other _____

Label #

LIMS Login

Tracking #: 1Z 281 271 03 7956 1956

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals Intact: ☐ yes ☑ no

Thermometer Used n/a Type of Ice: Wet Blue (None)

Cooler Temperature Observed Temp ____ °C Correction Factor: ____ °C Final Temp: ____ °C

Temp should be above freezing to 6°C

pH paper Lot# 1000391 Date and initials of person examining contents: SP 11/05/19

Comments:	Yes	No	N/A	
Chain of Custody Present:	✓			1.
Chain of Custody Filled Out:	✓			2.
Chain of Custody Relinquished:	✓			3.
Sampler Name & Signature on COC:		✓		4. No signature
Sample Labels match COC: -Includes date/time/ID Matrix: WT		✓		5. No date or time
Samples Arrived within Hold Time:	✓			6.
Short Hold Time Analysis (<72hr remaining):		✓		7.
Rush Turn Around Time Requested:		✓		8.
Sufficient Volume:	✓			9.
Correct Containers Used: -Pace Containers Used:	✓			10.
Containers Intact:	✓			11.
Orthophosphate field filtered			✓	12.
Hex Cr Aqueous sample field filtered			✓	13.
Organic Samples checked for dechlorination:			✓	14.
Filtered volume received for Dissolved tests			✓	15.
All containers have been checked for preservation. exceptions: VOA, coliform, TOC, O&G, Phenolics, Radon, Non-aqueous matrix	✓			16. pH<2
All containers meet method preservation requirements.	✓			Initial when completed SP Date/time of preservation Lot # of added preservative
Headspace in VOA Vials (>6mm):			✓	17.
Trip Blank Present:			✓	18.
Trip Blank Custody Seals Present				
Rad Samples Screened < 0.5 mrem/hr	✓			Initial when completed: SP Date: 11/05/19

Client Notification/ Resolution:

Person Contacted: _____ Date/Time: _____ Contacted By: _____

Comments/ Resolution: _____

☐ **A check in this box indicates that additional information has been stored in eraports.**

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

STURM ENVIRONMENTAL SERVICES

Main Office:
STURM ENVIRONMENTAL SERVICES
BRUSHY FORK ROAD
P.O. BOX 650
BRIDGEPORT, WV 26330
PHONE: 304-623-6549
FAX: 304-623-6552

STURM ENVIRONMENTAL SERVICES
610 D STREET
P.O. BOX 6337
SO. CHARLESTON, WV 25303
PHONE: 304-744-9864
FAX: 304-744-7866

REPORT TO: Client Name: Precision Oil & Gas
Address: P.O. Box 884
City/State/Zip: Bridgeport WV 26330
Contact Person: Blake Jones
Telephone Number: 304-709-8382 Fax No.
Email Address: bjones42@gmail.com
Sampler Name: (Print) Blake Jones
Sampler Signature: Blake J
Project Name: Tariff UIC
Special Reporting: X Email Results ____ Fax Results

BILL TO: Client Name:
Address:
City/State/Zip:
Contact Person:
Telephone Number: Fax No.
Email Address:
Purchase Order #:
TURN AROUND TIME: X Standard
____ RUSH (pre-scheduled; surcharges may apply) *Please Check One*
Date Needed

1 DAY | 2 DAY | 3 DAY

Sample ID / Description	COMPOSITE SAMPLE: START DATE	START TIME	END DATE	END TIME	GRAB SAMPLE: DATE	TIME	PRESERVATIVE: Ice	OTHER	HCl	H_2SO_4 Plastic	H_2SO_4 Glass	Hexane	HNO_3	MATRIX: Groundwater	Wastewater	Drinking Water	Sludge	Soil	Other (specify)	ANALYZE FOR: Other (specify) Brine Test	# of Bottles	Flow (gpm, cfs, mgd) circle one	Field pH	Field Conductivity	Field DO	Field Chlorine (mg/L or ug/L) circle one	Field Temp (F° or C°) circle one
Disposal Well Brine Injection Fluid					11/19	8:00	X												X	X	1						

Comments

Laboratory Comments:
Temperature Upon Receipt: 1.6
Bottles Preserved? (Y) N

Records retained for 5 years

Relinquished by:	Date	Time	Received by:	Date	Time
Blake Jones	11/19/19	10:30		11-19-19	1630
Relinquished by:	Date	Time	Received by:	Date	Time

coliert # 410 19

Pace Analytical
www.pacelabs.com

Page: of

1756249

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:
Company: Stum Environmental	Report To: Mhoops@stumenvironmental.com	Attention:
Address: PO Box 650	Copy To:	Company Name:
Bridgeport, WV 26330		Address:
Email To:	Purchase Order No.: 8455	Pace Quote Reference: 00064219
Phone: 304-623-6549 Fax:	Project Name:	Pace Project Manager: T. Crone
Requested Due Date/TAT:	Project Number:	Pace Profile #:

REGULATORY AGENCY

- NPDES
- GROUND WATER
- DRINKING WATER
- UST
- RCRA
- OTHER

Site Location STATE:

Section D Required Client Information

Matrix Codes — MATRIX / CODE

Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Tissue	TS
Other	OT

ITEM #	SAMPLE ID (A-Z, 0-9 / ,) Sample IDs MUST BE UNIQUE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Radium 226	Radium 228	Gross Alpha	Gross Beta	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Requested Analysis Filtered (Y/N)	N	N	N	N		
1	19005	DW	G			11/19/19	0800		3			X							X	X	X	X	N	
2																									
3																									
4																									
5																									
6																									
7																									
8																									
9																									
10																									
11																									
12																									

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
	K Kuhl	11/21/19	PM				

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: B. Jones

SIGNATURE of SAMPLER: DATE Signed (MM/DD/YY):

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

GEOCHEMICAL TESTING
Environmental and Energy Analysis

2005 N. Center Ave.
Somerset, PA 15501

814/443-1671
814/445-6666
FAX: 814/445-6729

Wednesday, November 27, 2019

VICKI HOOPS
STURM ENVIRONMENTAL SERVICES
PO BOX 650
BRIDGEPORT, WV 26330
PRECISION OIL & GAS, INC.

Order No.: G1911C92

Dear VICKI HOOPS:

Geochemical Testing received 1 sample(s) on 11/22/2019 for the analyses presented in the following report.

There were no problems with sample receipt protocols and analyses met the TNI/NELAC, EPA, and laboratory specifications except where noted in the Case Narrative or Laboratory Results.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Timothy W. Bergstresser
Director of Technical Services

ACCREDITED IN ACCORDANCE WITH nelac
I.D. 68-00306PA DEP

Geochemical Testing

Date: *27-Nov-19*

CLIENT: STURM ENVIRONMENTAL SERVICES
Project: PRECISION OIL & GAS, INC.
Lab Order: G1911C92 PWS: 9999999

CASE NARRATIVE

No problems were encountered during analysis of this workorder, except if noted in this report.

Legend:

H - Method Hold Time exceeded and is not compliant with 40CFR136 Table II.
U - The analyte was not detected at or above the listed concentration, which is below the laboratory quantitation limit.
B - Analyte detected in the associated Method Blank
QI - See case narrative ND - Not Detected
MCL - Contaminant Limit J - Indicates an estimated value.
Q - Qualifier QL -Quantitation Limit DF - Dilution Factor
S - Surrogate Recovery outside accepted recovery limits
T - Sample received above required temperature and is not compliant with 40CFR136 Table II.
TI - Sample received above required temperature
MDA - Minimum Detectable Activity.
** - Value exceeds Action Limit
TICs - Tentatively Identified Compounds
E - Value above quantitation range

ACCREDITED IN ACCORDANCE WITH nelac
I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *27-Nov-19*

CLIENT:	STURM ENVIRONMENTAL SERVICES	**Client Sample ID:**	19022
Lab Order:	G1911C92		
Project:	PRECISION OIL & GAS, INC.	**Collection Date:**	11/19/2019 8:00:00 AM
Lab ID:	G1911C92-001 INJECTION FLUID	**Sampled By:**	Sturm Environmental
Matrix:	AQUEOUS	**DateReceived:**	11/22/2019 10:33:22 AM

Analyses	Result	Q	MDL	PQL	Units	DF	Date Prepared	Date Analyzed
DISSOLVED GASSES			Analyst: TEW				ASTM D8028	ASTM D8028
Butane, dissolved	0.52		0.010	0.020	mg/L	1	11/25/19 4:04 PM	11/25/19 6:58 PM
Ethane, dissolved	1.4		0.010	0.020	mg/L	1	11/25/19 4:04 PM	11/25/19 6:58 PM
Methane, dissolved	0.76		0.010	0.020	mg/L	1	11/25/19 4:04 PM	11/25/19 6:58 PM
Propane, dissolved	1.3		0.010	0.020	mg/L	1	11/25/19 4:04 PM	11/25/19 6:58 PM
Surr: Ethoxyethane	132	S	0	70-130	%REC	1	11/25/19 4:04 PM	11/25/19 6:58 PM

Shuttle/Cooler ID#: 020

CHAIN OF CUSTODY

Geochemical Testing

Form F-5002, 12 16

Geochemical Testing • 2005 North Center Avenue • Somerset PA 15501 • (814) 443-1671 • Fax (814) 445-6729

Billing Client: Sturm Environmental	Contact (Company): Sturm	Phone: (304) 623-6549
Address: PO Box 650	e-mail: mhoops@sturmenvironmental.com	Fax: ( ) —
City: Bridgeport State: WV Zip: 26330	Sampled by: B. Jones	State Sampled: WV
WO#: G1911(a2	Project: —	PO/Quote#: 8454

Sample Matrix:	GW Ground Water	SW Surface Water	PW Potable Water	WW Wastewater	SO Soil	SL Sludge	nHZ Not Hazardous / HZ Hazardous	PCBs
Sample Type:	G Grab	C Composite	D Distribution/DW	R Raw/DW	S Special/DW	O Other		

Sample Location/ Description	Lab Number	Sample Matrix	Date	Time (Military)	Sample Type	**Analyses Requested	Remarks/ Preservatives, etc	Number of Containers
**NOTE: IF multiple analytes from one bottle, OR if multiple bottles for one analyte, THEN list separately on one line UNLESS LISTED ON ATTACHED FIELD LOG								
19022	001	L	11-19-19	0800	G	Dissolved Gases: Ethane	Field Filtered: Y (N)	3
						" Methane	Field Filtered: Y (N)	
						" Propane	Field Filtered: Y (N)	
						" Butane	Field Filtered: Y (N)	
							Field Filtered: Y / N	
							Field Filtered: Y / N	
							Field Filtered: Y / N	
							Field Filtered: Y / N	

Note Deficiencies Here:

Relinquished by (Company & Signature)	Date	Time (Military)	Received by (Company & Signature):	Date	Time (Military)
K. Kuebel / Sturm Environmental	11-21-19	PM	Marshall Galka	11-22-19	10:33

SAMPLES MUST BE PRESERVED ON ICE.

Ice present on receipt: X Yes or ___ No | Cooler Temp (°C) on receipt: 5

Sample Receiving (1st Review): TF | Client Support (2nd Review): —

STURM ENVIRONMENTAL SERVICES

Main Office:
STURM ENVIRONMENTAL SERVICES
BRUSHY FORK ROAD
P.O. BOX 650
BRIDGEPORT, WV 26330
PHONE: 304-623-6549
FAX: 304-623-6552

STURM ENVIRONMENTAL SERVICES
610 D STREET
P.O. BOX 8337
SO. CHARLESTON, WV 25303
PHONE: 304-744-9864
FAX: 304-744-7866

REPORT TO: Client Name: Precision Oil & Gas
Address: P.O. Box 884
City/State/Zip: Bridgeport, WV 26330
Contact Person: Blake Jones
Telephone Number: 304-709-8382 Fax No.
Email Address: bjones42@gmail.com
Sampler Name: (Print) Blake Jones
Sampler Signature:
Project Name: Tariff UIC
Special Reporting: X Email Results ____ Fax Results

BILL TO: Client Name:
Address:
City/State/Zip:
Contact Person:
Telephone Number: Fax No.
Email Address:
Purchase Order #:
TURN AROUND TIME: X Standard
____ RUSH (pre-scheduled; surcharges may apply) *Please Check One*
Date Needed

1 DAY	2 DAY	3 DAY

Sample ID / Description	COMPOSITE SAMPLE START DATE	START TIME	END DATE	END TIME	GRAB SAMPLE DATE	TIME	PRESERVATIVE Ice	OTHER	HCl	HNO_3	H_2SO_4 Plastic	H_2SO_4 Glass	NaOH	Zinc Acetate	MATRIX Groundwater	Wastewater	Drinking Water	Sludge	Soil	Other (specify):	ANALYZE FOR: Big Set	# of Bottles	Flow (gpm, cfs, mgd) circle one	Field pH	Field Conductivity	Field DO	Field Chlorine (mg/L or ug/L) circle one	Field Temp (F° or C°) circle one
Disposal Fluid						6PM																						
Injection Fluid					11/19	8:00	X														X	16						

Comments

Laboratory Comments:
Temperature Upon Receipt:
Bottles Preserved? (Y) N

Records retained for 5 years

Relinquished by:	Date	Time	Received by:	Date	Time
	11/19/19	10:30		11-19-19	1030
Relinquished by:	Date	Time	Received by:	Date	Time

collect # 410 19

Sturm Environmental Services

VICTORIA L. HOOPS, PRESIDENT

COMPANY: PRECISION OIL & GAS, INC.

SAMPLE ID: INJECTION FLUID

SAMPLED BY: B. JONES

DATE/TIME SAMPLED:* 11-19-19 0800

DATE/TIME RECEIVED: 11-19-19 1030

LABORATORY ID: POG 191119-1

PARAMETER	TEST RESULTS	UNITS	METHOD	METHOD DETECTION LIMIT	DATE/TIME ANALYZED	ANALYST
pH O	5.1	units	SM 22nd 4500 H B	.1	11-20-19 1731	HN
Fe	194.	mg/L	EPA 200.7 Rev 4.4-1994	.05	11-21-19 0726	DB
Mn	3.99	mg/L	EPA 200.7 Rev 4.4-1994	.002	11-21-19 0726	DB
TSS	140	mg/L	USGS I-3765-85	4	11-21-19 1401	MRM/EK
TDS	105160	mg/L	USGS I-1750-85	4	11-21-19 1401	MRM/EK
MBAS	.78	mg/L	SM22nd 5540C	.02	11-20-19 2313	SW
TOC	276.	mg/L	SM22nd 5310B	2.0	12-02-19 1647	LM
SO_4	385.	mg/L	EPA 300.0 Rev 2.1-1993	1.0	11-21-19 0332	DC
Cl^-	57400.	mg/L	EPA 300.0 Rev 2.1-1993	1.0	11-21-19 0322	DC
Al	.56	mg/L	EPA 200.7 Rev 4.4-1994	.04	11-21-19 0726	DB
As	.63	mg/L	EPA 200.7 Rev 4.4-1994	.04	11-26-19 0529	DB
Ba	42.2	mg/L	EPA 200.7 Rev 4.4-1994	.003	11-21-19 0726	DB
Ca	9273.	mg/L	EPA 200.7 Rev 4.4-1994	.15	11-21-19 0726	DB
Na	25600.	mg/L	EPA 200.7 Rev 4.4-1994	.05	11-21-19 0726	DB
SPEC GRAVITY	1.07051	calc	CALCULATION		11-20-19 1743	SW

*Client Provided

**See Attached The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

Data Qualifiers

B Analyte found in reagent blank. Indicates possible reagent or background contamination

E Estimated Reported value exceeded calibration range.

J Reported value is an estimate because concentration is less than reporting limit.

PND Precision not determined.

R Sample results rejected because of gross deficiencies in QC or method performance. Re-sampling and or re-analysis is necessary.

RND Recovery not determined.

U Compound was analyzed for, but not detected.

O Out of holding. Time does not meet 40 CFR 136/141 compliance.

T This result is not supported by our certification ID.

A Does not meet 40 CFR 136/141 compliance.

C Does not meet 47 CSR 32 compliance.

Narrative:

Approved Douglas H Bennett

Sturm Environmental Services

VICTORIA L. HOOPS, PRESIDENT

COMPANY: PRECISION OIL & GAS, INC.

SAMPLE ID: INJECTION FLUID

SAMPLED BY: B. JONES

LOG NO: W554-19

DATE/TIME SAMPLED:* 11-19-19 0800

DATE/TIME RECEIVED: 11-19-19 1030

LABORATORY ID: POG 191119-1

PARAMETER	TEST RESULTS	UNITS	METHOD	METHOD DETECTION LIMIT	DATE/TIME ANALYZED	ANALYST
Total Coliform	ABSENT	P/A (Cfu)	9223 Colilert	1	11-19-19 1114	LM
E Coli	ABSENT	P/A (Cfu)	9223 Colilert	1	11-19-19 1114	LM

*Client Provided

**See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

Microbiological analysis results will be discarded after 5 years

Method of Analysis from "Standard Methods for the Examination of Water and Wastewater,"

Data Qualifiers

B Analyte found in reagent blank. Indicates possible reagent or background contamination.
E Estimated Reported value exceeded calibration range.
J Reported value is an estimate because concentration is less than reporting limit.
PND Precision not determined.
R Sample results rejected because of gross deficiencies in QC or method performance. Re-sampling and/or re-analysis is necessary.
RND Recovery not determined.
U Compound was analyzed for, but not detected.
O Out of holding. Time does not meet 40 CFR 136/141 compliance.
T This result is not supported by our certification ID.
A Does not meet 40 CFR 136/141 compliance.
C Does not meet 47 CSR 32 compliance.

Narrative:

Approved Douglas H Bantz

Section 10
Monitoring

Section 10
Monitoring

The monitoring plan for the Tariff Field will be in compliance with all permit conditions and applicable UIC rules and regulations and will consist of the following:

1. Daily visual inspection and integrity check of pump equipment, storage tanks, secondary containment structures, storage tank valves, distribution lines, headers, and well heads.

2. Daily monitoring and recording of the maximum injection pressure, injection volumes, and hours of operation.

3. Daily monitoring and recording of annulus pressures either by gauge or chart recorder.

4. Monthly submission of all required injection data to the ESS website as compiled on the WR-40 form.

5. Submission of all corrective action data as required by the permit.

6. Monthly inspections of spill response equipment on site.

Section 11
Groundwater Protection Plan

APPENDIX H

GROUNDWATER PROTECTION PLAN

Facility Name: Tariff Field - See Attached SPCC

County: Roane

Facility Location: Tariff

Postal Service Address:	1422 Tariff Road		
	Left hand WV 25251		
Latitude :	38.662600	Longitude:	81.2123999

Contact Information:

Person:	Jodi Sutro
Phone Number:	(304) 587-4477
E-mail Address:	jodi.sutro@groundresourcesllc.com

Date: 10/26/17

1. A list of all operations that may contaminate the groundwater.

Oil / Gas Production, water injection.

possible injection and gathering pipeline leaks,
possible containment structure leaks,
possible equipment leaks,
possilble tank truck leaks if used.

2. A description of procedures and facilities used to protect groundwater quality from the list of potential contaminant sources above.

Secondary containment has been installed to contain 110% of liquids stored. Spill response equipment is stored at office Field Office.

3. List procedures to be used when designing and adding new equipment or operations.

Secondary containment will be installed for new equipment.

(4/23)

4. Summarize all activities at your facility that are already regulated for groundwater protection.

Oil/gas production, water injection

5. Discuss any existing groundwater quality data for your facility or an adjacent property.

Water samples have been analyzed to establish a baseline for previous permits

6. Provide a statement that no waste material will be used for deicing or fill material on the property unless allowed by another rule.

No Waste Water will be used for deicing or fill material on the property unless allowed by another Rule

7. Describe the groundwater protection instruction and training to be provided to the employees. Job procedures shall provide direction on how to prevent groundwater contamination.

Employees have received training on how to best management practices and spill response during safety training sessions.

dep

8. Include provisions for inspections of all GPP elements and equipment. Inspections must be made quarterly at a minimum.

Provisions for inspections have been included in the SPCC Plan.

Signature: David Park

Date: 10/30/17

dep

Section 12
Plugging & Abandonment

Section 12

A well work plugging permit must be obtained from the West Virginia Department of Environmental Protection Office of Oil and Gas before beginning any well plugging operation. Plan will be in compliance with all applicable plugging and abandonment regulations including 35CSR4-13. The guidelines provided in Oil and Gas rule and code will be followed to complete the necessary application to plug and abandon. The cement plug will be a minimum of 100 feet in thickness. A cement plug will be set above any perforation(s) and/or shot hole(s). All casings will be free pointed and as much casing will be removed as possible. A cement plug will be used to separate oil and gas bearing formations. A cement plug will be placed across all casing cuts. An elevation plug will be placed in each. If surface casing is cemented to surface a cement plug will be placed across the shoe and at the surface. If there is no cemented surface casing then a cement plug will be placed across fresh water zone and at the surface. Gel will be used as a spacer between all cement plugs.

Section 13
Additional Bonding

Section 13

Not applicable.

Section 14
Financial Responsibility

APPENDIX I

Requirement for Financial Responsibility to Plug/Abandon an Injection Well

To: WV Department of Environmental Protection
Office of Oil and Gas
601 57th Street, SE
Charleston, West Virginia 25304-2345
ATTN: Underground Injection Control Program

From: Ground Resources, LLC
513 Charleston Road
Spencer, WV 25276

Date: 10/26/17

Subject: Underground Injection Control (UIC) Permit Application
2R08702AP
Requirement for Financial Responsibility

I, David W Heeter, verify in accordance with 47CSR13-13.7.g., that I will maintain financial responsibility and resources to close, plug, and abandon underground injection wells(s) in a manner prescribed by the Chief of the Office of Oil and Gas.

Name: David W. Heeter

Signature: David Heeter

Date: 10/26/17

RECEIVED
Office of Oil and Gas
OCT 31 2017
WV Department of
Environmental Protection

Section 15
Site Security Plan

Section 15

Not applicable

Section 16
Additional Information

Section 16

See Appendix K

APPENDIX K

Identify permit or construction approvals received or applied for under the following programs:

Permit/approvals	ID Number
Hazardous Waste Management Program under RCRA	
NPDES Program	
Prevention of Significant Deterioration (PSD)	
Nonattainment Program	
Dredge or Fill	-
NPDES/NPDES – Stormwater	
WVDEP – Office of Waste Management (OWM) – Solid Waste Facility	
WVDEP – OWM – RCRA (Hazardous Waste TSD or Transporter)	
WVDEP – OWM – UST	
CERCLA – Superfund	
WV Voluntary Remediation – Brownfields	
FIFRA – Federal Insecticide, Fungicide and Rodenticide Act	
Well Head Protection Program (WHPP)	
Underground Injection Control (UIC)	2R08702AP
Toxic Substances Control Act (TSCA)	
Best Management Plans	STATE GUIDLINES
Management of Used Oil	
Other Relevant Permits (Specify):	


TARIFF FIELD
Ground Resources, LLC
Tariff Field
UIC Permit 2R08700008AP
Revised 7/20/2020
N
W
E
S
2736 SERGENT 1
2443 COMBS 2
2442 COMBS 1
Henry Fork Ch
3140 SNODGRASS 22
1981 MJ SNODGRASS 25
3131 WD COMBS 1
90908
90904
30523
90903
90907
2445 COMBS 2
2779 MJ SNODGRASS 14
2444 COMBS 3
30524
4081 SNODGRASS 106
3084 SNODGRASS 10
90900
2447 COMBS 5
90901
3063 W.D.COMBS 4
90902
2446 COMBS 3
4158 SERGENT 8
2777 MJ SNODGRASS 9
3110 SNODGRASS 8
4622 SERGENT 812
2776 MJ SNODGRASS 7
90897
90898
3109 LOONEY 19
3146 SNODGRASS 17
90896
3129 SNODGRASS 16
90899
90871
90872
90905
90873
4623 MJ SNOGRASS 813
90893
90894
90895
00443 SNODGRASS 23
2775 MJ SNODGRASS 6
3176 SNODGRASS 11
845
3096 LOONEY 18
90891
90890
90885
00933 CLARKSON 3
2640 LOONEY 9
90884
90892
3884 SNODGRASS 104
2780 MJ SNODGRASS 15
90889
2773 MJ SNODGRASS 4
90874
30684
3876 SNODGRASS 105
2774 MJ SNODGRASS 5
3885 SNODGRASS 103
3136 SNODGRASS 3
2844 TALLMAN 40
2778 SNODGRASS 12
90869
00914 CLARKSON 2A
3880 LOONEY 41
3088 LOONEY 17
90888
2772 MJ SNODGRASS 2
90875
90866
2644 LOONEY 15
3771 SNODGRASS 100
90887
4421 200410
3097 LOONEY 25
2771 SNODGRASS 1
3183 TALLMAN 42
90879
90876
90868
3976 LOONEY 46
3774 LOONEY 40
3773 SNODGRASS 102
3167 TALLMAN 37
03128 W.M. LOONEY 26
4172 LOONEY 50
90881
2633 LOONEY 1
90883
3772 SNODGRASS 101
90880
90878
3185 TALLMAN 35
2643 LOONEY 12
90882
4168 LOONEY 51
3127 LOONEY 23
2818 TALLMAN 1
2843 TALLMAN 39
90865
0862 TALLMAN 50
90870
880
3778 TALLMAN 73
90877
3130 TALLMAN 17
90862
3781 LOONEY 39
3769 LOONEY 38
2841 TALLMAN 36
90867
4171 LOONEY 52
3071 LOONEY 24
4080 LOONEY 49
3977 LOONEY 45
2635 LOONEY 4
90857
3777 TALLMAN 72
2821 TALLMAN 4
90855
2079 TALLMAN 53
3182 TALLMAN 41
90864
3148 13
3968 LOONEY 47
2827 TALLMAN 10
90852
3768 LOONEY 37
70406
4164 LOONEY 53
90860
4079 LOONEY 48
3974 LOONEY 44
0701 LOONEY 28
90854
3776 TALLMAN 71
3010 TALLMAN 34
0840 TALLMAN 49
90859
0444 LOONEY 27
90856
2641 LOONEY 10
2637 LOONEY 6
2824 TALLMAN 7
3878 TALLMAN 76
90848
3178 LOONEY 22
3083 LOONEY 14
90851
3879 TALLMAN 75
3181 TALLMAN 11
4088 TALLMAN 77
90847
3767 LOONEY 36
3775 TALLMAN 70
2638 LOONEY 7
4078 LOONEY 43
3875 LOONEY 42
0702 LOONEY 29
3659 LOONEY 30
3660 LOONEY 31
2826 TALLMAN 9
3163 TALLMAN 29
90850
0899 TALLMAN 52
90849
00450 LOONEY 3
4165 LOONEY 54
3766 TALLMAN 69
90843
90846
90829
3095 LOONEY 16
90834
3662 LOONEY 35
90838
ROANE CO.
3675 LOONEY 34
2636 LOONEY 5
2828 TALLMAN 13
90842
2822 TALLMAN 5
90844
3184 TALLMAN 18
90845
920
90837
3180 LOONEY 20
90830
4166 LOONEY 55
2639 LOONEY 8
3664 TALLMAN 68
3663 TALLMAN 67
3877 TALLMAN 74
934
90833
3179 LOONEY 2
3674 LOONEY 33
3661 LOONEY 32
3135 TALLMAN 12
2823 TALLMAN 6
2835 TALLMAN 23
90840
ROANE CO.
30300
2614 LEWIS 1
90841
90825
90831
3070 TALLMAN 48
2634 LOONEY 3
90836
3604 TALLMAN 61
2941 TALLMAN 60
90839
90832
3609 TALLMAN 66
3608 TALLMAN 65
2825 TALLMAN 8
3175 TALLMAN 24
2820 TALLMAN 3
90823
4624 PA TALLMAN 815
4646 TALLMAN 8151
4013 TALLMAN 64
2409 TALLMAN 59
90820
2080 TALLMAN 54
90822
2405 TALLMAN 55
90821
2831 TALLMAN 19
2833 TALLMAN 21
2832 TALLMAN 20
2836 TALLMAN 25
90812
2408 TALLMAN 58
90819
2407 TALLMAN 57
2406 TALLMAN 56
SMITHFIELD DISTRICT
GEARY DISTRICT
3624 TALLMAN 30
90818
2837 TALLMAN 26
3138 TALLMAN 27
90811
90810
02839 TALLMAN 32
90809
90805
3605 TALLMAN 62
2554 HOPKINS 2
30549
2840 TALLMAN 33
90806
90802
3134 HOPKINS 3
90808
02838 TALLMAN 31
90807
90804
02555 HOPKINS 4
90803
200412
2215 402
918
1000
02556 HOPKINS 6
00187 E. DYE 1
325
LEGEND
AOR BUFFER
TARIFF FIELD BOUNDARY
1 MILE AOR
.25 MILE AOR
INJECTOR - SHUT IN
INJECTOR - SHUT IN
INJECTOR - PLUGGED
INJECTOR - PLUGGED
2R OIL PRODUCTION
Active Well
Abandoned Well
Plugged
OIL PRODUCTION
Active Well
Abandoned Well
Plugged
Pre-1929 Unknown
GAS PRODUCTION
Active Well
Abandoned Well
Plugged
0 750 1,500 3,000 Feet
1 inch = 500 feet
PREPARED BY:
BLAKE JONES, GIS SPECIALIST
PRECISION OIL AND GAS, INC.

TARIFF FIELD

Ground Resources, LLC
Tariff Field
UIC Permit 2R08700008AP
Revised 7/20/2020

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W E
S

LEGEND

AOR BUFFER

- TARIFF FIELD BOUNDARY
- 1 MILE AOR
- .25 MILE AOR

INJECTOR - SHUT IN

- INJECTOR - SHUT IN

INJECTOR - PLUGGED

- INJECTOR - PLUGGED

2R OIL PRODUCTION

- Active Well
- Abandoned Well
- Plugged

OIL PRODUCTION

- Active Well
- Abandoned Well
- Plugged
- Pre-1929 Unknown

GAS PRODUCTION

- Active Well
- Abandoned Well
- Plugged

0 1,250 2,500 5,000 Feet

1 inch = 900 feet

PREPARED BY:
BLAKE JONES, GIS SPECIALIST
PRECISION OIL AND GAS, INC.